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COMPARISON OF THE STRENGTH OF MARQUIS, GARNET AND REWARD GROWN IN SASKATCHEWAN *

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INTRODUCTION

As the wheat producing area of Western Canada extended northward into what is known as the park-belt lands, the incidence of frosted wheat became greater, and a real need developed for an earlier maturing variety of hard red spring wheat that might have a chance to escape the early fall frosts that so commonly occur in these regions. After much careful experimentation and testing, the Dominion Department of Agriculture, Ottawa, selected a variety, Garnet, and after making tests for yield and other agronomic characters as well as for milling and baking quality, released it to the public in 1926. A very complete report of these tests is given by Newman and Whiteside (*11*). Their results with regard to milling and baking may be briefly summarized as follows: compared with Marquis, Garnet appeared to be equal in milling yield, appreciably higher in ash of flour, slightly greater in loaf volume, somewhat lower in absorption, and decidedly more yellow both in flour and crumb colour.

Upon the release of Garnet, many farmers in all parts of Western Canada experimented with it, but it was only in the northern area that its early maturity led to its serious adoption. The supplanting of an old established variety by a new one is usually a rather gradual process but the general frost of 1928 very materially hastened the introduction of Garnet. There were two principal reasons; firstly, the experience of farmers in each district who in 1928 harvested sound Garnet when their more unfortunate neighbors got grades of No. 5, 6 or feed for their frosted Marquis, and secondly the fact that in the spring of 1929, most of the good sound wheat in the northern districts was Garnet, and sound Marquis was difficult to procure for seed. Thus in the course of one year there occurred a very great swing from Marquis to Garnet in the park-belt lands of Saskatchewan, and in the following crop season a considerable quantity of Garnet was finding its way to the consumer.

As early as 1927, however, various mills in Western Canada had made commercial tests of this variety and there was even then, some expression of dissatisfaction with the milling quality and particularly with the colour of the flour. In 1929 Pearen, chemist of the Lake of the Woods Milling Co. scored this variety soundly for colour and milling quality. Farmers growing this variety, of course, considered it an injustice that it should not be admitted to all grades and some attempt was made, without success, to obtain the authority necessary to have it admitted to No. 1 Northern.

In 1928, it was decided to procure the opinion of the European millers with regard to the quality of Garnet. Accordingly, five carlots of Garnet were

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collected in Western Canada and distributed in the United Kingdom and Europe to various milling companies who were asked to conduct a comparison of Garnet and the ordinary Manitobas of similar grade. The results of this test are given in some detail by Newman (*10*), and in brief indicated that the European buyers would consider it advantageous to have this variety segregated into special grades, because of the fact that Garnet differed in some respects from the general run of Manitobas and could therefore be handled more advantageously by itself. This test did not aid materially in settling the differences of opinion with regard to the quality of Garnet.

As recently as December 10th, 1930, there appeared in the Canadian section of the North Western Miller, the following statement in a discussion of the possible shortage of high grade wheat suitable for domestic milling, "Owing to the admission of new wheat of inferior quality known as Garnet into all grades from No. 2 Northern downward, Canadian Millers will emphatically favor No. 1 hard and No. 1 Northern for the making of best quality Canadian flour from this crop". Such an admission of inferiority, coming from a Canadian source is a matter for serious consideration at any time and more especially at present when in a highly competitive market it is necessary to take advantage of every possible factor that might be used to recommend our wheat to the purchaser.

No such difference of opinion exists with respect to the milling and baking quality of the new variety Reward. Pearen (*12*) concluded that it is as good as Marquis and has no objectionable characteristics from the millers standpoint. We have heard no adverse criticism of the quality of this wheat. Unfortunately, there is prevalent the belief that it is susceptible to loose smut and farmers in Northern Saskatchewan have shown a tendency to regard it with a certain degree of mistrust on this account. It remains for the plant pathologist to demonstrate whether or not this belief has any basis in fact; our problem has to do particularly with the milling and baking quality.

As this department has conducted comparative milling and baking tests with these three varieties for several years, it seemed advisable to collect the data in as brief form as possible and set forth the conclusions to be drawn therefrom.

Experimental

Sources of Material Used

In the crop season of 1927, we procured twelve samples of Marquis and Garnet, grown on adjacent plots from seed supplied by this department. These plots were grown under field conditions, at places fairly representative of the wheat-producing area of Saskatchewan. A list of the places is to be found in table 1.

In the season of 1928, we added two more coöperators. Furthermore, in that year we procured milling samples of the wheat exhibited at the Saskatchewan provincial seed fair and in these, both Reward and Garnet were represented.

In 1929 a considerable addition to the number of our coöperators was made, and Reward as well as Marquis and Garnet was grown at twenty-five places in the province. The list of places is shown in table 3. In addition to these there were procured from members of the Saskatchewan Field Hus-

TABLE 1.—*Comparison of Marquis and Garnet grown on adjacent plots—1927.*

Place	Grade		Values of Garnet as percentage of corresponding Marquis sample.					
					Simple Formula		Bromate Formula	
	Marquis	Garnet	Protein of Wheat	Total Flour	Loaf Volume	Baking Score	Loaf Volume	Baking Score
Churchbridge	No. 4	3°	87	108	96	88	82	62
Indian Head	3°	3°	104	104	108	115	104	95
Kindersley	No. 5	No. 4	92	95	85	78	84	74
Lloydminster	3°	3°	98	96	100	99	86	78
Melfort	2°	2°	86	100	92	92	77	71
Rosthern	2°	2°	89	96	93	88	84	79
Saskatoon	No. 4	Rej. a–c sprouts	88	95	94	55	78	39
Scott	2°	2°	86	96	98	107	78	72
Swift Current	2°	2°	96	99	104	102	90	77
Tugaske	2°	2°	93	101	103	106	88	81
Wawota	No. 5	3°	94	103	96	92	95	68
Weyburn	3°	2°	91	101	89	73	–	–
Mean			92.0	99.5	96.5	91.25	86.0	72.4

bandry Association, ninety-five sets of the three varieties grown in one place. Actually we milled and baked 150 Garnet, 173 Reward and 342 Marquis samples of the 1929 crop and for each sample of Reward or Garnet there was a Marquis sample grown in the same place, to serve as a check.

As there was very little low grade wheat in 1929 and as, moreover, the range of protein was great, the results obtained on that crop are considered especially useful for throwing light on the question of the relative quality of these three varieties.

Methods Used for Testing Quality.

The 1927 samples were milled to a 75% patent, whereas all the 1928 and 1929 samples were milled to a straight, representing on the average close to 95% of the total flour.

The 1927 samples were baked by both the simple and bromate formulæ; all the other samples were baked by these and in addition by a blend-bromate formula, in which a percentage of very soft flour is used. With the 1928 samples 40% was used, and with the 1929 samples 50% was used. All baking was done by a fixed procedure, differing only in minor points from that of the American Association of Cereal Chemists outlined by Blish (*2*).

Loaf volume was measured in an hour-glass device of the specifications given by Geddes and Binnington (*4*).

The baking score was computed as follows:—

(Loaf volume cc.s—400)	×	.2
Texture Score	×	3.
Crumb Colour Score	×	2.
(Crust Colour + Appearance)	×	1.
(Absorption % — 60)	×	1.
Sum = Baking Score		

1927 Crop

Milling, baking and analytical data for the 1927 samples are summarized in table 1. Tabulation of the detailed data would transcend the scope of this paper and therefore we are giving the most pertinent part of the results in a form as condensed as possible. We show protein of wheat, loaf volume, and baking score of Garnet, all calculated in percentages of the corresponding Marquis sample. The actual grades for each variety are given.

There is practically no division of opinion regarding the colour of Garnet flour; it is admittedly more highly pigmented than Marquis. The texture of bread baked from the two flours shows no marked differentiation. These scores, together with appearance and absorption are moreover taken into account in calculating the baking score. As we are concerned almost solely with quality of the wheat, those data that are most indicative of this property, will be considered. The grades have been included only to give an approximate measure of damage to the samples.

As these samples were grown and harvested under as nearly as possible identical conditions, we will consider all of them in order to obtain an estimate of the relative value of the two varieties.

Referring to table 1 it will be observed that the protein content of the Garnet was on the average 7.5% lower than the Marquis. This is not due to several exceptional cases; on the contrary 11 of the 12 samples were lower than Marquis in protein of wheat. The baking data, if we consider the simple or basic formula first, indicate on the whole that there is a real difference between these two varieties. The average percentage for the baking score is 91, but this low value is due largely to the Saskatoon sample of Garnet which was very badly sprouted (estimated 17%.) But even leaving that sample out, the average value is 94 or 6% lower than the Marquis samples. It is interesting to note that in several other cases namely, Churchbridge, Kindersley, and Wawota where the Marquis graded lower than Garnet, it still showed superior baking quality. However, the differences shown by these figures are scarcely great enough to enable one to conclude that the Garnet is very much inferior to the Marquis.

Werner (*13*), Blish and Sandstedt (*3*), Larmour and MacLeod (*9*), Larmour (*6, 7*) and Harris (*5*) have brought forward considerable evidence which indicates that the simple formula by itself is not entirely satisfactory as a measure of quality when used on experimentally milled flours.

In nearly every kind of practical baking, some sort of flour stimulant is used. It was found by Larmour and MacLeod (*9*) that the addition of small amounts of $KBrO_3$ profoundly affected flours experimentally milled from Saskatchewan hard wheat, in such a way that those with high protein gave better loaves, while those having some forms of damage gave poorer loaves than by the simple or basic formula. It has been shown, moreover, by Larmour and Machon (*8*) that the effect of this oxidizing agent on unbleached experimentally milled flours is very similar to the effect of chlorine-bleaching. In view of the fact that practically all our wheat is used for flour that is going to be bleached or at least baked with addition of flour improvers of various sorts, it seems advisable to use the bromate formula when estimating the probable commercial value of a wheat sample. The simple formula often gives

results that are so much at variance with the results of practical experience that in this laboratory it has been almost entirely discarded as a measure of quality and has been superseded by the bromate and blend-bromate formulæ. In the latter formula, a mixture of the experimental flour and a very soft flour is used in order to obtain a measure of relative blending capacity of the flour. This formula was not adopted as a routine procedure until in 1928 and we, therefore, have no results by this method for the 1927 samples.

Returning now to a consideration of the bromate data in table 1, it can be seen that the Marquis reacted more favourably than the Garnet, for the difference between the two is decidedly accentuated. The Garnet, on the average gave loaf volumes only 88% as large as the Marquis. This is a large difference and it may be considered quite significant particularly as in all but one case the Garnet values were below the corresponding Marquis value. These differences are still further accentuated in the baking scores which, on the average show the Garnet to be 26% lower than the corresponding Marquis samples.

The relation of protein and loaf volume by the bromate formula for the two varieties is most clearly shown in figure 1. In all but one case the protein and loaf volume of the Marquis is greater than the corresponding Garnet sample.

The results with the 1927 samples lead to the conclusion that in that year Garnet was significantly lower than Marquis in both protein and quality. This is rather surprising when one considers that the 1927 crop was particularly low in protein on the average. With the samples we have considered the highest value obtained was 14.7% and the average for the Marquis was only 12.9%. One might expect that as the general protein average becomes low, the differences between varieties would tend to decrease, but on the contrary, it is indicated that when Marquis is quite low Garnet is considerably lower.

The 1928 Crop.

The data obtained with the 1928 samples are given in table 2. It should be observed first that only 6 of the 14 Marquis samples fell in the contract grades, whereas all but one of the Garnet samples were 3 Northern or better.

Of the low grade Marquis samples, 4 graded below No. 4 and these may be considered to have been definitely damaged by the frost. On the basis of these grades there is no doubt that the sale value of the Marquis was very materially lower than the Garnet.

If we consider all the samples irrespective of grade, the Garnet was on the average 0.6% higher in protein than the Marquis. By the simple formula, there was no significant difference in loaf volume but the Garnet baking score was 4% higher than the Marquis. This would indicate that on the average the Marquis had been scored down for colour, texture and appearance and this can be attributed largely to the heavily frosted Marquis samples which produced a most objectionable grey flour. These average values, however, are rather unreliable because on examining the data in detail it can be seen that with respect to baking score, only 6 of the 14 samples of Garnet equalled or exceeded the corresponding Marquis sample, the remainder being distinctly inferior. The Lloydminster and Wawota samples are respon-

TABLE 2.—*Comparison of Marquis and Garnet grown on adjacent plots in 1928.*

Place	Grade		Values of Garnet as percentage of corresponding Marquis sample.							
					Simple Formula		Bromate Formula		Blend Formula	
	M.	G.	Wheat Protein	Total Flour	L.V.	C.B.S.	L.V.	C.B.S.	L.V.	C.B.S.
Churchbridge	No. 5	2°*	91	101	82	63	89	75	90	72
Guernsey	No. 4	2°*	102	99	93	84	92	92	96	91
Indian Head	1°	2°*	108	99	110	118	100	104	100	101
Kindersley	No. 5	2°	104	102	86	85	91	102	97	104
Lloydminster	No. 6	No. 4	105	97	158	244	146	150	113	113
Marcelin	1°	2°	104	98	93	72	90	86	87	74
Melfort	1°	2°*	98	99	97	86	94	99	90	83
Rosthern	No. 6	2°	102	112	81	49	96	98	112	122
Saskatoon	No. 4	2°*	103	99	85	68	94	99	96	96
Scott	1°	2°*	99	97	98	100	92	96	95	94
Swift Current	1°	2°*	88	102	102	103	92	86	86	79
Tugaske	1°	2°*	102	98	98	105	96	96	87	76
Wawota	No. 4	2°*	100	102	124	200	113	123	107	101
Weyburn	No. 4	3°	103	101	97	92	98	96	95	94
Mean			100.6	100.4	100.4	104.2	98.8	100	96.5	93.6

* Could have graded 1°.

sible for bringing the average value above 100%. Omitting these two, the average becomes 88%.

With the bromate formula, somewhat the same average results were obtained and here again it is found that the equality is due to the two samples mentioned above.

The blend formula shows average values somewhat lower than the others. Only in three cases, namely Lloydminster, Rosthern, and Wawota is the Garnet significantly higher in loaf volume than the Marquis, while in 5 cases it is significantly lower.

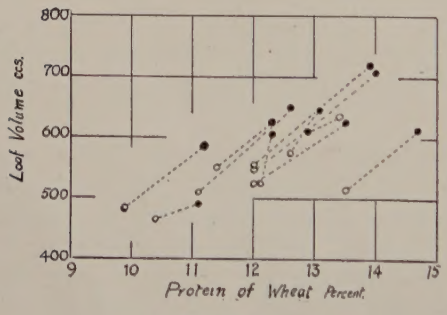

Figure 1

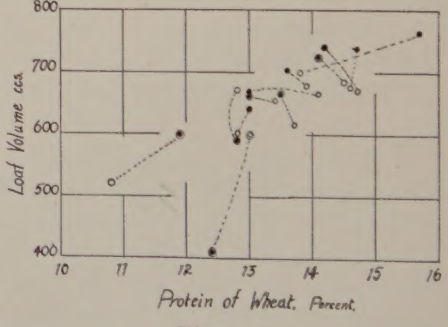

Figure 2

Figure 1. Comparison of Marquis and Garnet grown on adjacent plots in 1927; loaf volume by the bromate formula. Marquis •, Garnet °.

Figure 2. Comparison of Marquis and Garnet grown on adjacent plots in 1928; loaf volume by the bromate formula. Marquis •, Garnet°. Those with outer rings were below 3 Northern in grade.

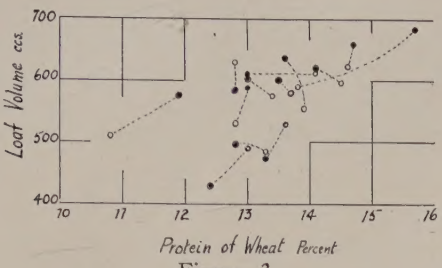

Figure 3

Figure 3. Comparison of Marquis and Garnet grown on adjacent plots in 1928; loaf volume by the blend-bromate formula. Marquis •, Garnet °. Those with outer circles were below 3 Northern in grade.

The actual values of loaf volume by the bromate and blend formulæ are shown graphically in figures 2 and 3. Samples below contract grade are indicated by an outer circle. Six of the eight frost-damaged Marquis samples show by both methods, superiority over the corresponding sound Garnet samples.

If these samples can be considered fairly representative of the 1928 crop, one may conclude that even without making any allowance for frost damage, the Marquis was on the average equal to the unfrosted Garnet samples. Considering the individual cases it is apparent that in the majority of cases the Marquis was superior to the Garnet, irrespective of whatever damage it had received from the freezing.

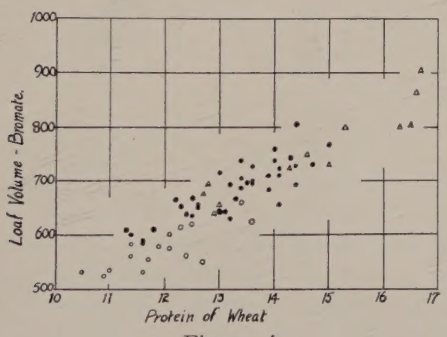

Figure 4

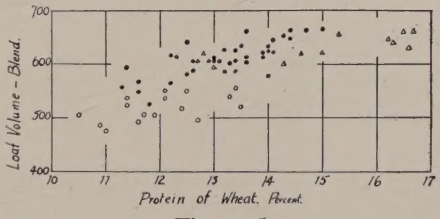

Figure 5

Figure 4. Seed Fair samples 1928. Protein of wheat and loaf volume by the bromate formula. Marquis •, Garnet °, Reward △.

Figure 5. Seed Fair samples 1928. Loaf volume by blend-bromate formula and protein of wheat. Marquis •, Garnet °, Reward △.

Quality of the 1928 Seed Fair Exhibits

In this crop season, owing to the scarcity of sound wheat, we procured and tested samples of the hard red spring wheat exhibited at the provincial seed fair. With these samples there were no check samples of Marquis grown on the same farm, but in spite of this the samples yield quite valuable information, because they represent to a greater degree than the previously considered cases, the quality of the varieties grown in the districts where they are most likely to be grown; that is to say, the Garnet samples came from

the more northerly areas, whereas the Marquis came from anywhere in the province. There were 38 Marquis, 16 Garnet and 13 Reward samples. They represented probably the choicest wheat that could be procured in Saskatchewan in that season, and were all free from frost damage. The grade assigned by the Winnipeg inspection office may be summarized as follows:—

Number of Samples grading.

Variety	1 Hard	1 Nor.	2 Nor.	Total
Marquis	16	19	3	38
Garnet	—	—	16*	16
Reward	10	3	0	13

* From the standpoint of soundness, all but one of these could have graded 1 Nor.

Without giving the complete data, the results may be summarized as in table 3. The loaf volumes by the bromate and blend formulæ, plotted against protein of wheat are shown graphically in figures 4 and 5 respectively.

TABLE 3.—*Average results obtained with the 1928 seed fair samples.*

	Marquis	Garnet	Reward
No. of Samples	38	16	13
Protein of Wheat	13.2	12.0	14.8
Loaf Volume			
Simple formula	593	555	669
Bromate formula	682	575	754
Blend formula	611	519	627
Baking Score			
Simple formula	88	77	111
Bromate formula	118	89	130
Blend formula	96	68	99

The Garnet samples on the whole were lower in protein and lower in quality than the Marquis, whereas the Reward samples were generally higher in quality and higher in protein than the Marquis. It seems that Garnet taken from areas that might be expected to produce it is very considerably inferior in quality to the average Marquis.

The data obtained with Reward for the 1928 crop serve only as an indication that this variety produces wheat of high protein and high baking quality.

The 1928 results may be summarized by saying that with the samples grown on adjacent plots from the same seed, the Garnet was slightly, but not significantly higher in protein content and much superior in grade. Despite the frost-damaged samples the Marquis gave, in the majority of cases, baking results as good as or better than the Garnet.

In a series of samples that may be considered to have been randomly selected with respect to origin, the Garnet was distinctly inferior and the Reward superior to the Marquis.

Thus in two successive seasons, one in which the general quality was very low, and one in which the protein was normal but with a large incidence of frost-damage, our tests showed Garnet to be inferior in quality to Marquis. To make the tests complete there was needed a crop in which the general quality would be very high. The season of 1929 produced just such a crop.

The 1929 Crop

The quality of this crop was unusually high; the range of protein in Saskatchewan was great (6.9%—19.3% in the samples tested) and the harvest season was such that but a small percentage of damage from frost and practically no damage from wetting, bleaching or sprouting occurred. The acreage sown to Garnet had increased very much, due chiefly to the frost of 1928, and a great number of farmers throughout the province were experimenting with the new variety Reward. It was considered the proper time to conduct a quite extensive program of investigation of these three varieties in order to obtain conclusive evidence concerning their relative merits.

The samples tested are naturally divided into two classes; one consisting of those grown under our supervision and those collected from other sources. We will consider first those grown specifically for this department.

Marquis and Garnet

A comparison of the Marquis and Garnet samples of the 1929 crop is given in table 4. With respect to grade, the Beauval and Cumberland House

TABLE 4.—*Comparison of Marquis and Garnet grown on adjacent plots in 1929.*

Place	Grade		Values of Garnet as percentage of the corresponding Marquis Sample.							
	M.	G.	Wheat Protein	Total Flour	Simple		Bromate		Blend	
					L.V.	C.B.S.	L.V.	C.B.S.	L.V.	C.B.S.
Beauval	No. 4	2°	93	109	101	100	89	72	98	91
Churchbridge	1°	2°	82	102	81	61	80	79	85	78
Cumberland House	No. 6	3°	94	109	116	153	109	110	105	116
Fox Valley	2°	No. 4	102	98	100	99	101	100	97	93
Indian Head	1 hd.	2°	109	104	108	109	104	104	88	76
Kamsack	1 hd.	2°	100	99	94	78	90	90	94	77
Kindersley	1 hd.	2°	108	101	102	105	94	103	90	71
Lloydminster	1°	2°	—	100	85	70	94	91	87	76
Loverna	1°	2°	101	102	109	132	112	115	87	78
Meadow Lake	1 hd.	2°	101	100	112	143	88	77	87	67
Melfort	2°	2°	88	98	82	71	81	87	88	63
Muenster	3°	2°	93	106	93	79	82	80	86	74
Riverhurst	2°	3°	97	101	108	108	110	114	83	76
Rosthern	1°	2°	100	101	106	110	94	88	93	87
Saskatoon	1°	2°	102	100	73	55	95	92	95	83
Scott	2°	3°	92	100	100	88	84	78	80	61
Shaunavon	1°	No. 4	93	98	100	102	95	90	90	82
Spruce Lake	3°	3°	90	96	99	77	93	90	72	38
Swift Current	3°	No. 5	93	98	107	91	110	119	82	69
Tugaske	1°	2°	107	99	105	118	114	111	96	95
Wawota	1°	2°	112	102	101	91	131	122	103	105
Weyburn	1 hd.	2°	102	100	96	90	104	99	85	78
Mean			98.0	101.0	99.0	96.8	97.5	95.9	89.6	78.8

Marquis were low, due to frost-damage, and the Fox Valley, Shaunavon and Swift Current Garnet were low, due to shrunken kernels; all the others graded 3 Northern or higher.

The protein content of the Garnet samples was on the average 2% lower than the Marquis but on looking over the individual cases it can be seen that Garnet protein was less than Marquis in approximately half the places; in the other half it was equal or higher. Perhaps it would be well to point out here that this season of 1929 was really a combination of two extreme sets of weather conditions. In the southern part of the province, there was little rainfall and hot weather, a condition tending to produce high protein and low weight per bushel, whereas in the northern areas there was abundant rainfall which tends to produce a lower protein content and a higher weight per bushel. Now, altogether aside from the question of quality, there are various reasons for not growing Garnet in the southern parts of Saskatchewan where Marquis ordinarily can be satisfactorily harvested and no one has ever really expected that Garnet would have a chance to displace Marquis in this area. If we divide up these data into two groups, one representing the districts where Garnet might be expected to supplant Marquis, and one where there is little chance of that occurrence, we get results for wheat protein as shown in table 5.

TABLE 5.—*Comparison of Garnet and Marquis with respect to protein when grown in the north eastern and south western areas of Saskatchewan.*

North eastern Saskatchewan	Protein of Garnet as % of corresponding Marquis	South western Saskatchewan	Protein of Garnet as % of corresponding Marquis
Beauval	93	Fox Valley	102
Churchbridge	82	Indian Head	109
Cumberland House	94	Kindersley	108
Kamsack	100	Loverna	101
Meadow Lake	101	Riverhurst	97
Melfort	88	Saskatoon	102
Muenster	93	Scott	92
Rosthern	100	Shaunavon	93
Spruce Lake	90	Swift Current	93
		Tugaske	107
		Wawota	112
		Weyburn	102
Average	93.4	Average	101.5

This might be interpreted to indicate that under weather conditions favorable to the production of high protein wheat, Garnet would on the whole give as good an average result as Marquis, whereas under conditions of abundant rainfall such as are likely to prevail in the northern areas, Garnet will be most decidedly inferior to Marquis in protein. It should be recalled that in the 1927 crop season there were conditions favorable to low protein and that in practically all the places where we grew these two varieties the Garnet was lower in protein than the Marquis. Examination of the baking data shows that these same considerations hold true. In all cases, Cumberland House excepted, where Garnet exceeds the Marquis, it was produced in the southern part of the province.

It should be pointed out that whereas the average quality of Garnet as shown by the bromate data is only slightly lower than Marquis, only 6 of the 22 samples considered exceeded Marquis, the other 16 being equal or lower, and of these 9 can be classed as decidedly lower than Marquis. With the blend formula only two samples of Garnet equalled or exceeded the Marquis in loaf volume and 14 were 10% or more lower. These data lead to the conclusion that Garnet is decidedly inferior to Marquis in blending value, a factor that is of very great importance in estimating the value of our wheat to the European miller. The blend data are more clearly shown in figure 7.

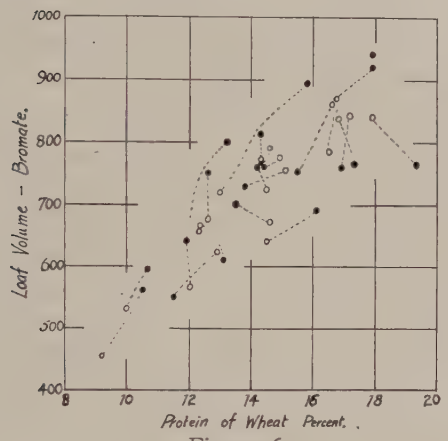

Figure 6

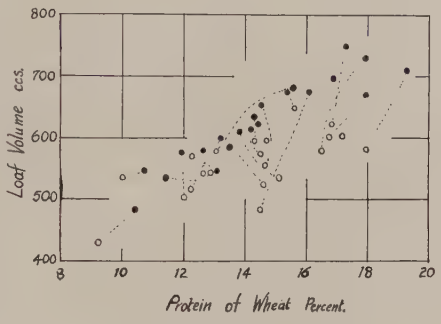

Figure 7

Figure 6. Comparison of Marquis and Garnet grown on adjacent plots in 1929; loaf volume by the bromate formula. Marquis •, Garnet °.

Figure 7. Comparison of Marquis and Garnet grown on adjacent plots in 1929; loaf volume by the blend-bromate formula. Marquis •, Garnet °.

Marquis and Reward

A summary of the comparative data obtained on samples of Marquis and Reward grown under our supervision from seed supplied by this department is given in table 6.

The Reward exceeded the Marquis in protein of wheat in 21 of the 25 places. On the average the value for Reward was found to be 109% of the corresponding Marquis and it can be seen that this is due not to a few exceptional cases but rather to a general trend. In 15 cases the Reward is 10% or more higher in protein. This difference is reflected in the bromate baking data, where the Reward is on the average 13% better than the Marquis in respect to loaf volume. By the blend data the Reward is 3.4% higher than the Marquis on the average. The difference here is not so great as found with the bromate formula and we find 8 samples that are inferior to the Marquis check sample, showing that for blending purposes Reward is not as much superior as may have been indicated by the bromate data. In fact it will be shown later that on the basis of equal protein, the Reward is very slightly inferior to the Marquis in blending value. A comparison of figures 8 and 9 may show these differences more clearly. In figure 8 it is at once apparent that in general the Reward is superior to Marquis grown under the same

TABLE 6.—*Comparison of Marquis and Reward grown on adjacent Plots in 1929.*

Place	Grade		Values of Reward as percentage of the corresponding Marquis Sample							
	M.	R.	Wheat Protein	Total Flour	Simple		Bromate		Blend	
					L.V.	C.B.S.	L.V.	C.B.S.	L.V.	C.B.S.
Beauval	No. 4	2°	110	109	115	128	116	122	106	106
Cadillac	2°	2°	105	103	119	136	124	126	103	101
Churchbridge	1°	1°	89	96	86	78	87	87	92	90
Cumberland House	No. 6	No. 4	112	111	112	139	120	125	119	148
Fox Valley	2°	2°	97	99	88	79	83	79	100	100
Indian Head	1 hd.	1 hd.	122	100	111	122	126	126	108	111
Kindersley	1 hd.	1 hd.	118	101	100	103	108	118	99	91
Lanigan	1°	1 hd.	114	103	108	109	115	121	104	106
Lloydminster	1°	1°	111	100	102	106	105	105	105	103
Lost River	2°	1°	121	100	117	131	130	139	111	123
Loverna	1°	1 hd.	101	102	112	138	116	123	95	96
Meadow Lake	1 hd.	1 hd.	124	98	137	188	129	119	104	98
Melfort	2°	1 hd.	114	102	111	116	114	122	111	116
Muenster	3°	1°	108	102	106	111	106	105	105	109
Paswegin	2°	2°	124	102	113	114	119	120	111	116
Riverhurst	2°	1°	101	98	105	105	122	127	91	88
Rosthern	1°	2°	111	98	111	124	109	109	104	104
Saskatoon	1°	1°	115	100	83	74	108	108	112	115
Scott	2°	2°	101	95	105	109	105	102	97	89
Shaunavon	1°	2°	93	99	96	91	82	83	101	100
Spruce Lake	3°	3°	102	95	105	100	106	108	93	88
Swift Current	3°	3°	98	102	97	81	109	110	99	98
Tugaske	1°	1°	114	97	111	143	122	118	104	104
Wawota	1°	1 hd.	114	102	109	96	136	135	112	118
Weyburn	1 hd.	1 hd.	110	100	100	100	121	118	98	96
Mean			109.2	100.6	106.4	112.8	112.7	114.2	103.4	104.6

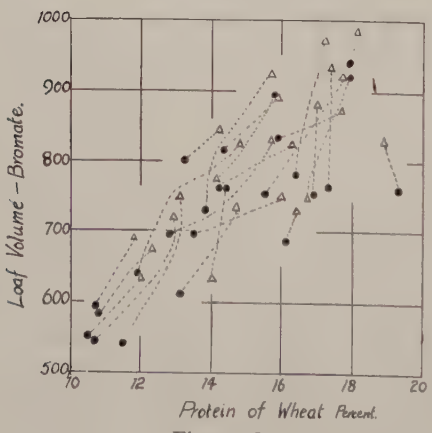

Figure 8

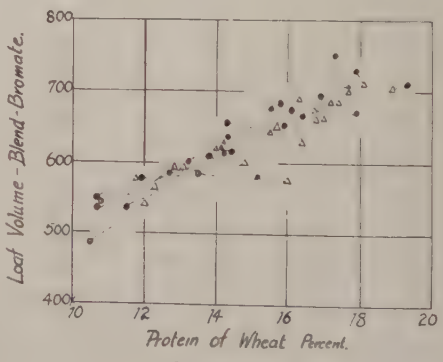

Figure 9.

Figure 8. Comparison of Marquis and Reward grown on adjacent plots in 1929; loaf volume by the bromate formula. Marquis •, Reward △.

Figure 9. Comparison of Marquis and Reward grown on adjacent plots in 1929; loaf volume by the blend-bromate formula. Marquis •, Reward △.

conditions, in both protein and loaf volume, whereas in figure 9 there are a fair number of cases where the loaf volume of Reward by the blend formula is inferior despite the higher protein content.

Comparison of Marquis, Garnet and Reward from same Farm

On account of the wide range in protein and the virtual absence of damaged grain in 1929 it was thought advisable to make the study of these varieties as comprehensive as possible. Requests were sent to members of the Saskatchewan Field Husbandry Association, asking those growing all three varieties to forward milling samples. The response indicated that there was considerable interest in the relative value of these three wheat varieties.

In virtually all cases where the three varieties were sent in they were grown by the one man under field conditions. There were a few instances in which one variety was procured from a neighboring farm. On the whole the material may be considered fairly representative of the wheat actually procurable in the province.

These samples were all milled as described heretofore and baked by the three methods. It is obviously impossible to give the detailed results of these tests and we, therefore, submit in table 7 a very condensed summary of the comparative results, using the loaf volume by the bromate and blend formulæ and the protein of wheat as the basis of comparison.

TABLE 7.—*Comparison of Marquis, Reward and Garnet samples grown in the same place. Crop 1929.*

Classes	Frequency of occurrence—percent.					
Percentage of Marquis check	Wheat Protein		L. V. Bromate		L. V. Blend-Bromate	
	Reward	Garnet	Reward	Garnet	Reward	Garnet
161-165%	1					
156-160			1			
151-155	1		1			
146-150						
141-145	2		1			
136-140	2		3	1	1	
131-135	4		3	1		
126-130	7	1	9		1	
121-125	11	3	16	1		
116-120	13	3	14	1	5	
111-115	21	5	15	4	16	
106-110	13	6	16	7	19	3
101-105	11	17	9	7	26	6
96-100	9	16	5	15	23	16
91- 95	3	16	3	15	8	27
86- 90	1	16	2	15	1	26
81- 85		9	2	19		16
76- 80	1	5		7		4
71- 75		3		4		2
66- 70				3		

In this summary there are 118 Marquis-Reward and 116 Marquis-Garnet pairs, and these include those pairs grown under our own supervision which

have been discussed in the preceeding section. In preparing this summary, the values for the Reward and Garnet were calculated as percentages of the corresponding Marquis sample grown in the same place. These values were then grouped on a 5% increment and the frequencies calculated as

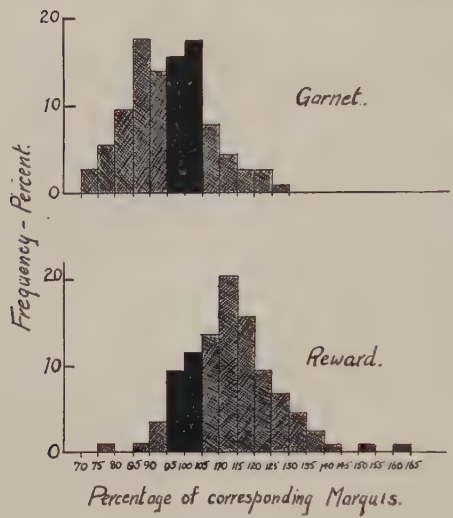

Figure 10.

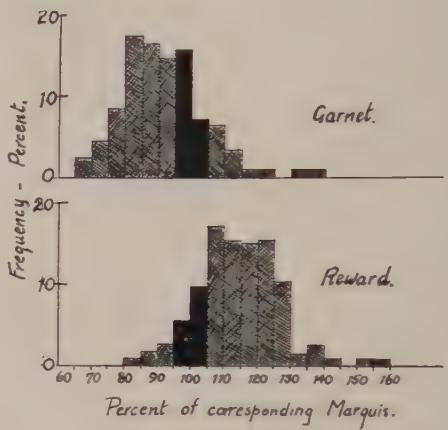

Figure 11.

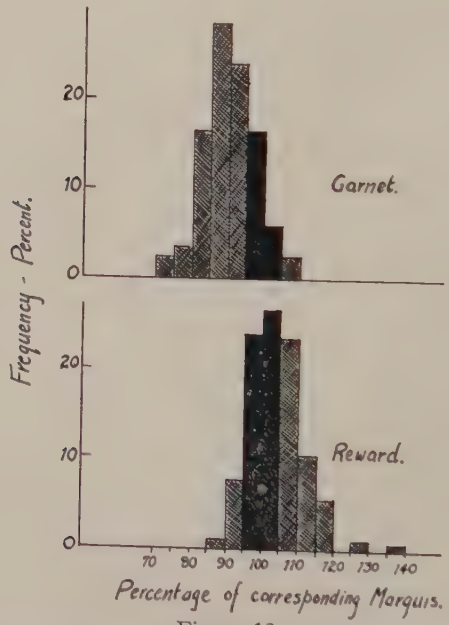

Figure 12.

Figure 10. Comparison of Marquis—Reward and Marquis—Garnet pairs of the 1929 crop with respect to wheat protein.

Figure 11. Comparison of Marquis-Reward and Marquis-Garnet pairs of the 1929 crop with respect to loaf volume by the bromate formula.

Figure 12. Comparison of Marquis-Reward and Marquis-Garnet pairs of the 1929 crop with respect to loaf volume by the blend-bromate formula.

percentages. To show more clearly the relationship of these figures, histograms for each variable, protein, loaf volume bromate and loaf volume blend are presented in figures 10, 11, and 12 respectively. In these diagrams the classes 96—100% and 101—105% have been blocked in solidly in black. This represents a range of 4% below and 5% above equality. Although this is a rather wide range for the measurements under consideration, we shall consider these values not significantly different from equality, in order that our deductions may be quite conservative.

Comparing the histograms in figure 10 it is at once evident that in these samples, the Reward is distinctly higher and the Garnet distinctly lower than Marquis in protein content. We have actually the following distribution:

TABLE 8.—*Comparison of Garnet and Reward with respect to Percentage of samples higher, equal, and lower than Marquis in protein.*

	Garnet	Reward
Higher than Marquis	19%	75%
Equal to Marquis	33%	20%
Lower than Marquis	48%	5%

The differences of the three varieties with regard to protein of wheat are therefore real and very significant.

For loaf volume bromate we have the following distribution:—

TABLE 9.—*Comparison of Garnet and Reward with respect to percentage of samples higher, equal, and lower than Marquis in loaf volume bromate.*

	Garnet	Reward
Higher than Marquis	14%	80%
Equal to Marquis	23%	14%
Lower than Marquis	63%	6%

Figure 11 shows the Garnet well displaced to the lower side with 80—85% as the modal class, and Reward almost wholly displaced to the higher side of equality with Marquis, with 105—110% as the modal class.

For loaf volume by the blend-bromate formula the distribution is as follows:—

TABLE 10.—*Comparison of Garnet and Reward with respect to percentage of samples higher, equal, and lower than Marquis in loaf volume by blend-bromate.*

	Garnet	Reward
Higher than Marquis	3%	42%
Equal to Marquis	22%	50%
Lower than Marquis	75%	8%

Figure 12 shows that for loaf volume by the blend formula the modal class for Garnet is 85—90%, and for Reward it is 100—105%. Here again it is very apparent that Garnet is distinctly lower in quality than Marquis and that Reward is on the whole equal or better in quality.

These results justify the conclusion that *leaving entirely aside any consideration of milling quality or colour of flour, Garnet wheat judged solely on quality as shown by loaf volume is distinctly inferior to Marquis grown under the same conditions, both when baked alone and in a blend with soft flour.*

The Relation of Quality and Wheat Protein of Marquis, Garnet and Reward.

It has been found by Larmour (*6*) (*7*) and Harris (*5*) that the quality of Western Canadian hard red spring wheat is very closely correlated with the protein content of the wheat, especially when the quality is estimated by a formula embodying $KBrO_3$. The discussion of Marquis, Garnet and Reward has been based entirely on comparison of Garnet and Reward with Marquis grown in the same place, and as it has been shown that in general there is a significant difference in the protein content of these varieties, the question naturally arises: do these varieties show the same quality when they have the same amount of protein? This problem is most easily approached by means of a classification of loaf volumes on the basis of protein. For this study there were used the data on all the samples of these three varieties of the 1929 crop that were graded 3 Northern or higher. There were 342 Marquis, 173 Reward and 150 Garnet samples. The necessary statistics were calculated on the data grouped on a 0.5% protein increment basis. The calculations made on these data are given in table 11.

TABLE 11.—*Statistics calculated for the 1929 samples.*

	Marquis	Reward	Garnet
Number of samples	342	173	150
Protein of wheat—mean	13.51	14.54	12.24
Protein of wheat—standard deviation	2.03	2.15	2.38
Loaf volume by simple formula			
Mean	580	622	556
Standard deviation	45.1	59.2	56.2
Correlation coefficient	+.410	+.604	+.812
Regression coefficient (loaf volume on protein)	9.1	16.6	19.2
Loaf volume by bromate formula			
Mean	711	785	630
Standard deviation	96.4	125.7	128.1
Correlation coefficient	+.859	+.911	+.944
Regression coefficient (loaf volume on protein)	36.9	53.2	50.8
Loaf volume by blend-bromate formula			
Mean	598	610	528
Standard deviation	54.7	61.3	55.0
Correlation coefficient	+.853	+.824	+.820
Regression coefficient (loaf volume on protein)	22.7	23.5	19.0

The average protein of the wheat was 13.5%, 14.5% and 12.2% for Marquis, Reward and Garnet respectively. These values were calculated from fairly large samples, and may, we think, be considered fairly representative of the actual values. The value for Marquis, 13.5% is exactly equal to the weighted mean of the Reward and Garnet. Birchard and Aitken

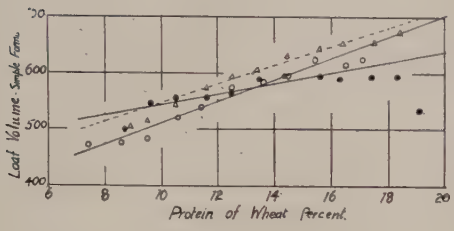

Figure 13.

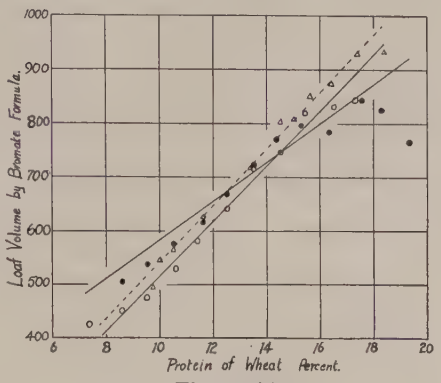

Figure 14

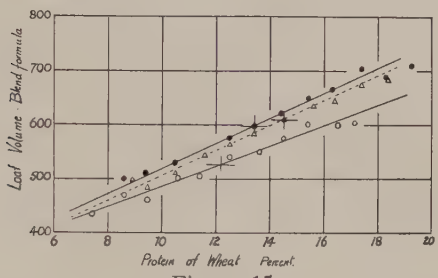

Figure 15

Figure 13. Regression of loaf volume by the simple formula, on protein of wheat—1929 samples. Marquis •, Garnet °, Reward △.

Figure 14. Regression of loaf volume by the bromate formula, on protein of wheat—1929 crop. Marquis •, Garnet °, Reward △.

Figure 15. Regression of loaf volume by the blend-bromate formula, on protein of wheat—1929 samples. Marquis •, Garnet °, Reward △.

(1930) showed 13.47% as the weighted average of 4998 commercial samples of Saskatchewan wheat of the 1929 crop.

The correlation coefficients for protein and loaf volume by the simple or basic formula were + .410, + .604 and +.812 for Marquis, Reward and Garnet respectively, and the slopes of the regression lines were 9.1, 16.6 and 19.2 respectively. The latter are shown in figure 13, together with the average value for each 1% increment of protein. From these curves one would conclude that with increasing protein, the quality of Garnet increases more rapidly than either Marquis or Reward, but these data doubtlessly give erroneous estimates of quality. For one thing, it is evident that the regression of Marquis loaf volume is non-linear and the straight regression line shown does not represent the most probable value of the loaf volume. Furthermore, the correlation of loaf volume and protein for Marquis is + .41, which means that as far as these data go, only 17% of the variance of loaf volume is attributable to protein. With the Garnet data, the correlation coefficient of +.81 indicates that 66% of the variance is calculable from the protein. Obviously these loaf volume data cannot be considered a fair basis on which to compare the value of protein in the three varieties.

The regression of loaf volume (bromate) on protein of wheat, for each of the three varieties, is given in figure 14. It will be seen that the slope of the regression line for Marquis is less than for either Garnet or Reward, and that it cuts both of the latter. Inspection of the real averages, however, shows that this regression line does not fit the data well, and there is every evidence for thinking that above the protein value 16%, the regression is decidedly curved. Larmour (*7*) has shown that with a wide range of protein values such as we have here, a test showing non-linearity does not necessarily mean that the whole regression is curved, but may mean that for a large number of classes it is straight, being curved for only a portion, usually in the higher ranges. In figure 13 it appears that the regression line for the Reward fits the Marquis data up to 16% much better than the curve belonging to it, and it is not unreasonable to conclude that if the higher proein samples, above 16% were omitted, the regression of loaf volume on protein for Marquis would nearly coincide with the regression for Reward.

From table 11 it is seen that the regression coefficient for Reward is slightly greater than for Garnet, indicating that there is a slight tendency to diverge in the extremes. These two regression lines do not intersect in the range of protein we are considering, and it is evident therfore that throughout the range, the Reward is higher in quality than Garnet of the same protein content. If our discussion of the Marquis regression is correct, we can conclude also that Marquis up to 16% protein is higher in quality than Garnet of the same protein content.

Considering next the data by the blend-bromate formula, one sees in figure 15 that the regression lines fit the respective averages with rare consistency. Larmour (*7*), studying all these data as a single group, found that only the loaf volume by the blend-bromate method gave linear regressions on protein throughout the whole range of protein found. This seems to hold true also for the separate varieties. As the correlation coefficients for all three varieties are of about equal magnitude, +.853, +.824 and −.820 for Marquis, Reward and Garnet respectively, one may compare the regressions with little uncertainty.

The Marquis and Reward samples appear to be very nearly equal in blending value, the Marquis being higher by an average amount of about 10 cc.s. The Garnet regression line would intersect the Reward line at 6% protein, and the Marquis line at about 4%. From there upward there is a quite distinct divergence until at 18% the difference between Marquis and Garnet is slightly more than 60 ccs. With all three varieties there is a quite regular increase in loaf volume with increasing protein, but the Garnet does not increase as rapidly as the other two. Moreover, for the whole range from 7% to 19% Garnet is on the average distinctly inferior. This means that a Garnet and a Marquis of equal protein content, as for instance 14%, would likely give volumes of 560 and 610 ccs. respectively.

From these considerations one must conclude that there is a very significant qualitative difference between Marquis and Garnet, the latter being inferior. With protein constant, Reward is on the average very slightly lower than Marquis in blending quality.

SUMMARY

Milling and baking tests were made on samples of Marquis and Garnet grown on adjacent plots in the years 1927, 1928 and 1929. It was found that generally, the Garnet was lower in protein and in baking quality than the corresponding Marquis sample. The difference in protein content seemed to be more pronounced when weather conditions were favorable to high yield and low protein. When grown under dry conditions, there was little average difference in protein of the two varieties.

A study of a large number of samples of the 1929 crop on the basis of protein content lead to the conclusion that in general Marquis and Reward are decidedly superior to Garnet of the same protein content. In respect to blending value as shown by the blend-bromate formula, Marquis and Reward are nearly equal, and both are very much superior to Garnet of the same protein content. It was concluded therefore that in respect to protein there exists a real qualitative difference between Garnet and the other two varieties.

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BOTRYTIS TULIPÆ (Lib.) Lind. *

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I. The Production of Conidia as Influenced by Various Factors

Abundant evidence has been obtained that conidiospore infection is largely responsible for the rapid spread of Tulip Fire, *Botrytis Tulipæ* (Lib.) Lind., in the commercial bulb gardens of the coast regions of British Columbia. A relatively insignificant number of infected plants early in the spring have been found responsible frequently for a general infection within a few weeks through wind borne conidia. It became apparent that successful control measures must include a means of preventing conidiospore infection. A potassium resin sulphide spray was developed (*1*) that more effectively prevented this type of infection than the standard sprays, probably due to its better spreading and adhesive properties. In order to spray at the most effective growth periods it became necessary to ascertain what factors influence the production of conidia. Our interest in conidia production was accentuated by our observations in agreement with those of Hopkins (*2*) that conidia are produced somewhat rarely on culture media under ordinary laboratory conditions.

Experimental

This study of the factors which influence the production of conidia is based upon the behaviour of the fungi in petri dishes on a series of distinct culture media. The media employed were as follows.

Media	Preparation
(1) Tulip extract agar	Numbers 1—6 were prepared by slowly heating to the boiling point the equivalent of 100g. dry weight of the ground material and 1 litre of distilled water, filtering and adding 15 g. agar after making up to volume.
(2) Carrot extract agar	
(3) Cantaloupe extract agar	
(4) Barley meal extract agar	
(5) Corn meal extract agar	
(6) Tomato extract agar	
(7) Potato dextrose agar	Prepared as 1—6 with the addition of dextrose (1%).
(8) Ammonium synthetic agar	Prepared by dissolving in a litre of distilled water, $(NH_4)_2SO_4$, 2 g.; K_2HPO_4, 0.5 g.; MgSO 0.2 g.; NaCl 0.2 g.; dextrose 20. g. and agar 15. g.
(9) Nitrate synthetic agar	Prepared as (8) except that $Ca(NO_3)_2 . 4H_2O$, 1.0 g. replaced the $(NH_4)_2SO_4$.
(10) Potato discs	Prepared by cutting slices of large potatoes 3mm. thick, placing in petri dishes and sterilizing in the autoclave.
(11) Tulip pulp	Prepared by spreading a thick layer of tulip bulb pulp, the filtrate residue from (1), in petri dishes and sterilizing.

* Contribution from the Division of Botany, Experimental Farms Branch.
† Pathologist-in-charge and Plant Disease Investigator respectively.

(12) Tartrate synthetic agar — Prepared as (8) except that sodium potassium tartrate, 10 g., replaced the dextrose.

(13) Citrate synthetic agar — Prepared as (8) except that sodium citrate, 10 g., replaced the dextrose.

(14) Acetate synthetic agar — Prepared as (8) except that sodium acetate, 10 g., replaced the dextrose.

(15) Oxalate synthetic agar — Prepared as (8) except that potassium oxalate, 10 g., replaced the dextrose.

TABLE 1.—*Showing the effect of temperature and media favourable for mycelial growth on conidia production.*

Media number	Inocula	Incubation period	Conidia production upon cultures grown at					
			0-5°	15°	20°	25°	28°	30°
1	mycelia	8	XXX	XXX	X	X	–	–
	sclerotia	11	–	XXX	XXX	0	–	–
	conidia	10	–	XX	X	0	0	–
	"	24	XXX					
2	sclerotia	12	XXX	X	X	0	0	–
3	sclerotia	11	–	XXX	–	–	–	–
4	sclerotia	11	–	0	–	–	–	–
5	sclerotia	12	0	0	0	0	0	–
6	sclerotia	No growth of mycelia.						
7	mycelia	8	XXX	0	0	0	0	0
8	mycelia	8	XXX	0	0	0	0	0
9	mycelia	8	0	0	0	0	0	0
10	mycelia	8	XXX	XXX	XXX	XXX	–	–
10	conidia	5	–	XX	XXX	XXX	XX	–
"	"	24	XXX					
11	sclerotia	9	XXX	XXX	XX	XX	–	–

Index of conidia production: 0 = zero, X = scanty, XX = fair, XXX = good.

TABLE 2.—*The effect of temperature and media unfavourable to mycelial growth on conidia production.*

Media number	Inocula	Incubation period 8ys	Conidia production upon cultures grown at					
			0-5°	15°	20°	25°	30°	Final pH
12	mycelia	4	X	XX	XX	X	0	6.5
13	"	4	X	X	X	X	0	6.9
14	"	4	X	X	0	0	0	7.0
15	"	4	X	X	X	0	0	6.9

Index of conidia production: 0 = zero, X = scanty, XX = fair, XXX = good.

The data upon the influence of the culture medium and temperature relative to the production of conidia are given in tables 1 and 2. Although fair to excellent growths of mycelia are produced on media 1 to 11 inclusive, with the exception of tomato extract agar, it will be noted from table 1 that the media exerts an influence upon conidia production. On barley, cornmeal and nitrate synthetic agars no conidia are produced, while on tulip extract, tulip pulp and potato discs, the production is abundant. It is evident from the data in both tables that low temperatures favour the production of conidia. Above 25°C. the production of conidia is comparatively rare. Upon the synthetic media containing no sugar, 12 to 15, in spite of the sparse abnormal mycelial growth, conidia production is relatively abundant. Although the actual production is small in any of these cultures, relative to the sparse mycelial growth, the production may be considered large. This agrees with the observations of Ramsey (*3*) with respect to Sclerotinia species, that unfavourable media stimulates conidia production. Ramsey also reported micro-conidia production upon unfavorable media but in these experiments with *B. Tulipæ*, macro-conidia only were observed.

TABLE 3.—*The effect of* pH *on conidia production, at approximately 20°* C.

Initial pH	8.1	7.1	6.2	4.9	3.1	2.5
Age 5 days	X	X	0	0	0	0
	X	X	0	0	0	0
	X	X	X	0	0	0
Age 7 days	XX	X	0	0	0	XXX
	XX	X	0	0	0	XXX
	XX	X	X	0	0	XXX
Final pH	4.9	4.6	4.0	3.6	3.0	2.5

Index of conidia production: 0 = zero, X = scanty, XX = fair, XXX = good.

Upon the first eleven types of culture media the inocula produced a fair to excellent crop of mycelia with the exception of tomato extract agar (medium 6), upon which no growth at all occurred. On the last four, in which the carbon was supplied by compounds other than dextrose, the inocula produced a very sparse crop of mycelia. All tests were run in quadruplicate cultures and the data presented represent the mean of four cultures except where cultures were discarded because of the appearance of contaminants.

The data in table 3 show that conidia production is markedly affected by the hydrogen ion concentration of the media. On media adjusted to pH values unfavourable for the growth of mycelia, the production of conidia was abundant. On the other hand, when the initial pH values were favourable for the growth of mycelia, little or no conidia production occurred. The optima mycelial growth rates were obtained in cultures adjusted to pH 4.9 and it will be noted that no conidia were produced. A change in the reaction towards the acid and alkaline side induced conidia production. Upon

cultures having initial values of pH 2.5 and pH 8.1 the production was most abundant. On the alkaline compared with acid conditions the conidia appeared earlier but were confined to the centre of the colonies. In contrast, under acid conditions, a copious production covered the whole surfaces of the colonies. It will be noted that the pH values of the cultures all tend to decrease except those initially very acid. In these experiments all cultures were grown on ammonium synthetic agar (medium 8) adjusted with tenth normal sodium hydroxide and hydrochloric acid.

TABLE 4.—*The effect of air humidity and temperature on conidia production.*

Temperature of incubation	Relative humidity of air				
	100%	90%	73%	30%	uncontrolled
5 C.	XXX	XXX	0	0	XXX
20 C.	0	0	XXX	0	XXX
30 C.	0	0	0	0	0

Index of conidia production: 0 = zero, X = scanty, XX = fair, XXX = good.

The data in table 4 show that at 5°C., relatively high humidities are favourable for conidia production. At 20°C, it would appear that partial drying out stimulates conidia production, in agreement with the observation of Hopkins (*2*). Under a 30% relative humidity no significant mycelial growth occurs and hence no conidia are produced. The humidities were regulated by placing the petri dishes in closed containers containing salt solutions of known vapour pressures.

TABLE 5.—*The effect of temperature upon the size of the conidia.*

Incubation temperature	Conidia Measured	Mean length u	P.E. u
15°C	100	20.2	± 3.8
20°C	100	16.2	± 1.9
25°C	100	18.9	± 3.5
28°C	100	14.8	± 2.7

Dimensions of conidia grown at all temperatures 10.2 ± 1.8 x 17.5 ± 3.0.

The data in table 5 show the effect of temperature upon the length of the conidia. Those produced at 20°C, are less variable in size, but there is no significant relationship between temperature and size. In general, the sizes of the conidia, (10.2 ± 1.8 × 17.5 ± 3.0) agree with the measurement data presented by Hopkins (*2*).

DISCUSSION

It has been found that certain vegetable media are more favourable for the production of conidia than others, but in general when the composition,

pH or temperature are unfavourable for mycelial growth, conidia production is stimulated. Under field conditions it is probable that temperature is the most important of the factors that stimulate conidia production. These laboratory studies support the field observations of Dowson (*4*). He observed that after a period of cold weather the disease was always abundant. This investigation suggests the advisability of applying protective sprays to the tulip foliage in the early Spring particularly during periods of cold weather.

Summary

(1) On barley meal, corn meal and nitrate synthetic agars, good crops of mycelia were produced but no conidia. On the other hand, tulip bulb extract agar, tulip pulp, and potato discs produced abundant crops of both mycelia and conidia, but in general, media unfavourable for the growth of mycelia induced conidia production. On synthetic media in which the carbon was supplied as tartrate, citrate, acetate, and oxalate salts, the mycelial growths were sparse and abnormal, and relatively abundant crops of conidia were produced.

(2) Low temperatures favoured the production of conidia. Above 25°C., conidia rarely were produced.

(3) Media made unfavourable for mycelial growth by increasing or decreasing the hydrogen ion concentration, became favourable for the production of conidia. At the optimum for mycelial development, pH 4.9, no conidia were produced, but abundant conidia appeared when the initial pH was adjusted to pH 2.5 and pH 8.1.

(4) The production of conidia at 5°C. was favoured by high relative humidities, 90% to 100%, but at 20°C, lower humidities, around 73%, were more favourable.

(5) The conidia upon cultures grown at 20°C. were less variable in size but no significant relationship was found between size and temperature.

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PRESIDENTIAL ADDRESS

Presented at the Eleventh Convention of the C.S.T.A.

W. T. Macoun
Central Experimental Farm, Ottawa, Ont.

When I had the honour of being elected President of the Canadian Society of Technical Agriculturists last year I felt that I was accepting a great responsibility in a critical year in the history of the C.S.T.A. We had recently lost our popular and very efficient Secretary, Fred Grindley, by death, one who had from its beginning put his whole heart and strength into the Society. He had nurtured and guided it as few, if any, others would have done, and it was felt by many that the C.S.T.A. had received such a blow through his death, that its development would be severely checked, and that, perhaps, disintegration might begin to set in. But Fred Grindley had passed on to many much of his own enthusiasm; he had laid a strong foundation and had built a structure that would take more than his death to shake. The result was that the Honorary Secretary, Mr. L. H. Newman, immediately took up the torch, and, with the assistance of the retiring President, the incoming President, the Directors, and Miss Henry, whose services were invaluable at that time, the work was carried on and preparations made for the Annual Convention held at Wolfville, N.S., in June, 1930. This Convention was a great success. There were good lecturers, a large attendance, and a local committee that spared no pains to give the visiting members and their wives a pleasant time and an opportunity of seeing as much of the Maritime Provinces as was possible in the few days they were there. The association of the Convention with Acadia University was also much appreciated.

The success of the 1930 Convention did much to make those who attended it feel that, although Fred was not with us, the C.S.T.A. would continue to grow in strength.

The appointment of Mr. Howard L. Trueman as General Secretary at the Wolfville Convention, was well received by the members, and through my close association with Mr. Trueman during the past year, and from what has been said to me concerning him by many members whom I have met in widely separated parts of Canada, I feel that no mistake was made in electing him as General Secretary. On the contrary, the C.S.T.A. was exceedingly fortunate in finding one who has proved so competent. We all deplore his not being with us at this meeting and the cause of his absence.

Before leaving Nova Scotia last June, Mr. Trueman and I decided that it was important and in the best interests of the C.S.T.A. for us, as President and General Secretary, to visit together, if possible, all the C.S.T.A. locals, and do what we could to hold and enthuse the membership, and, if possible, to increase it. Fortunately, it was possible for us to make a journey West together in October, 1930, when I was making my annual visit to the Branch Experimental Stations.

On this trip we attended C.S.T.A. meetings at Kelowna, Victoria, Vancouver, Calgary, Edmonton, Saskatoon, Regina, Winnipeg and Kapuskasing. We considered all of these very successful meetings. A large proportion of

the members attended on every occasion, and great enthusiasm for the C.S.T.A. was shown.

Mr. Trueman, in his addresses, went into the details of the work of the C.S.T.A., its financial condition, the policy in regard to our journal, *Scientific Agriculture*, and answered questions in regard to the C.S.T.A. and its work. My part was to try and convince any members, who were doubtful of the value of the C.S.T.A. to them, that membership should be considered not from a dollars and cents standpoint but from that of fellowship with some twelve hundred men engaged in the many branches of agriculture. The C.S.T.A. might be called a federation of alumni, linking the men from the various colleges throughout Canada into one strong body capable of great things for the advancement of Canadian agriculture. There is no other large body of men which knows so well the needs and viewpoints both of the town and country as members of the C.S.T.A., who, for the most part, were brought up on farms, were educated in both country and town, and are now serving both. It is something to be able to say that one is a member of such a body to which belong premiers of provinces, presidents of universities, ministers of agriculture, deans of agriculture, members of parliament, farmers, and men in many kinds of business associated with agriculture, and others in a great variety of federal and provincial occupations, showing that the C.S.T.A. appeals to men occupying all kinds of positions where the science of agriculture plays a part.

The importance and responsibility of being President of this large and influential body of men so weighed on my mind that, as I have related on several occasions since, I had a dream the first night Mr. Trueman and I were on our way to Western Canada. I dreamed that A. G. Turney nominated me for President of the United States, and I was elected. This is no time to give the details of this dream but they are interesting.

After our return from the West, the Secretary went to Amherst, N.S., to meet the Maritime men, and then he and I visited and addressed the locals at Toronto, Quebec, Ste. Anne de la Pocatière, Montreal, Macdonald College, and the Niagara Peninsula local at Hamilton. We visited the O.A.C., Guelph, and have been delighted to learn that a local has since been formed there. As showing that the members are keen and anxious to be more active, the men at and near Calgary, who, up to the time of our visit last autumn, were members of a local covering Calgary, Edmonton, and other parts of Alberta, decided that they wanted to meet oftener, and that this could be accomplished by forming a local with Calgary as its centre, and this has been done. An additional local has also been formed at Montreal. There are now twenty locals compared with seventeen last year, and I might say here that the General Secretary tells me that we have now 1277 members compared with 1163 last June, a gain of 114, the largest yearly gain in five years.

I take this occasion to express my warm appreciation and extend my sincere thanks to the executive and committees of the various locals for organizing the many meetings to suit our convenience, and for the luncheons, suppers and banquets so liberally provided.

The T. Eaton Company for three years generously granted scholarships through the C.S.T.A., as is well known and highly appreciated. What this

has meant to the thirteen young men chosen for these scholarships is known best by those men, but the value of higher education, to those who have been anxious to get it and who have proved, by their previous work, that they are competent to take it, is common knowledge. It is believed, and it has already been proven by what some of these men have done already, that they will do much greater work for Canada with the better training these T. Eaton Company Scholarships have afforded them.

It was scarcely to be expected that the T. Eaton Company would renew the scholarships so generously given during the past three years, and they advised us that it was not possible for them to do so at present.

Other organizations and individuals were approached for scholarships but, owing, mainly, we believe, to the present financial depression, none of them offered to grant scholarships this year, but hope was held out that something might be done in the future.

All will agree, I think, that there has been an improvement in our journal, *Scientific Agriculture*, during the past year, following the keen discussion that took place in regard to it at the last Annual Convention. Without lowering the high standard of the scientific papers published in this journal, an attempt has been made, and, we believe, a successful one, to have each number appeal to a larger proportion of the members by making the articles more varied. The General Secretary informs me that there is so much good material for *Scientific Agriculture* now on hand that this policy, if it meets with the approval of this Convention, can be continued even more effectively during the coming year.

The memorial to our late General Secretary, F. H. Grindley has been kept well in mind during the past year and action taken. Suggestions were asked for and received from the locals and from individuals. The one suggestion which met with unanimous approval was that there should be a painting of our late Secretary, to be hung in the C.S.T.A. rooms at Ottawa, which would keep his memory green through this generation and for long after those who knew and loved him had passed away. This has been done, and the painting will be unveiled at this Convention. It has been left for this Convention to decide what other form of memorial there should be.

Our standing committees continue to do good work. Most of the locals have programmes during the winter where valuable information is presented to the members and new knowledge acquired, which is passed on to non-members. The meeting of members of locals in a social way is undoubtedly helpful, but it is for someone to discover how the membership, acting as a body, can do some still greater work for Canadian agriculture, how the locals can make a greater impression on the agriculture of the district each of them serves, and how the individual member can better help those who are making their living or trying to make their living from the soil.

We should all endeavor to make the C.S.T.A. a stronger organization, and much thought may well be given to how this can best be done.

There is the great international association, The American Association for the Advancement of Science, with which the C.S.T.A. is affiliated and to which some of our members belong and in which are many sections dealing with the science of agriculture in its many branches, but how many of the members of the C.S.T.A. attend the meetings of this Association or give papers at it?

Very few. There are about one hundred members of the C.S.T.A. who have stated that their preference is for horticulture, most of whom are devoting most of their time to horticulture. The affiliated Society of the American Association for the Advancement of Science, in which these men are most interested, is the American Society for Horticultural Science, an International Society, and yet, out of 153 papers given at the meeting of this Society last winter, there were but three from Canada given by two authors. This was not because more Canadian papers coulld not have been given of as high a standard as those presented. There must have been other reasons. I mention the American Society for Horticultural Science as I am best acquainted with it. We now have the Horticultural Group of the C.S.T.A., and, judging by the number who attend and give papers, this is filling a long felt want in Canada. There is now also a Soils Group of the C.S.T.A.

We are pleased to have the following Societies meeting with us this year:

The Eastern Canada Society of Animal Production.

The Canadian Society of Agricultural Economics.

The Canadian Phytopathological Society.

It is hoped that there will be more groups formed within the C.S.T.A., and that there will be still closer association between the C.S.T.A. and other Societies dealing with the science of agriculture.

In closing, I should like to make a plea for the average or below average man.

If every man had all the useful information that has already been obtained by scientific research and if every man used this to the greatest advantage in his chosen occupation doubtless production would be greatly increased, quality very much improved, and marketing, let us hope, made more profitable, but how few men use to the greatest advantage the information they do have.

There are, doubtless, many reasons for this, but the greatest reason, if one is to judge by the small proportion of outstanding successes in agriculture, as in all other walks of life, apart altogether from the present depression, is the lack of capacity of a very large proportion of us for making a great success of an undertaking so far as financial success is concerned.

If this is so, and I think all will agree that it is, then should not more effort be directed to better methods of helping the average or below average man? Should we not pay more attention to extension work in the C.S.T.A., and, if possible, discover more scientific methods of approach? Would a greater study of psychology be helpful?

REPORT OF THE GENERAL SECRETARY

Presented at the Eleventh Convention of the C.S.T.A.

Howard L. Trueman

In presenting the Eleventh Annual Report of the General Secretary of the Society, I have followed the form adopted by our late General Secretary and repeated last year by the Acting General Secretary. While this year has been a difficult one in many respects, I am pleased to be able to report substantial progress in the affairs of the Society. This report covers the period of activities from June 1, 1930 to May 31, 1931.

Membership

On May 31, 1930 the total membership of the Society reported at the Maritime Convention was 1163, made up of 1118 regular members, 6 life members and 39 student members. Since that time it has been necessary to remove the names of 40 members for non-payment of dues or because of death or resignations. During the same period 101 regular members have been admitted as well as 53 new student members, making a total membership at the present time of 1277 members. This represents a net gain of 114 members to the Society, the largest annual gain in five years. On May 31, 1931, 94 per cent of the members were fully paid up as compared with 91 per cent last year at the same date. The increases have been spread out fairly well over all locals, although especially notable is the revival of interest in the North Western Ontario branch. The foregoing information is tabulated in the following:

1930 Membership:		
Life members	6	
Regular members	1118	
Student members	39	
Total		1163
Taken off:		
Resignations, non-payment and death	40	
Balance		1123
New Members:		
Regular members	101	
Student members	53	
Total present membership		1277

The increase in membership is distinctly encouraging when we recall that no special membership campaign was conducted this year and when we remember that the Society is now entering its twelfth year and that the field of eligibles has been thoroughly canvassed from time to time. The tendency of senior students to join on graduation is noticeable and the increase in student membership this year gives us an increased number of prospective regular members for next year.

Scientific Agriculture

The journal has continued to receive financial assisatnce from several sources which are named on the front cover of each issue and the maintenance of the journal in its present form depends upon these grants. A large part of the advertising revenue is applied to the expense of publication.

During the past year the number of manuscripts received has been considerably in excess of that received last year and it is becoming increasingly difficult to guarantee publication as promptly as has been the case in the past.

In arranging the table of contents for each issue the Managing Editor has not felt himself bound to publish manuscripts in the order in which they have been received in the office. To follow such an order exactly would result in a lack of balance which would often make the issue uninteresting to the

majority of the members. Members have expressed their preferences in at least sixteen different fields of agriculture and an attempt has been made during the past year to arrange the publication of articles in that order which would give the widest possible interest to each issue. The Editor feels that distinct progress has been made along this line. Service has also been given to members who presented material which required publication immediately in order to protect the research work of various departments and the members themselves. Priority in the publication of material is a matter of reasonable consideration to all research men and we have not felt ourselves obligated to hold some articles back to be published in the order in which they were received.

The "Notes and News" section has been kept above the minimum of four pages recommended by the Winnipeg convention. Occasionally space has been used in this section to call attention to particularly timely articles in the same issue because we have felt that too many members had a tendency to lay the magazine aside after reading the notes and news. This has been checked up several times during the past year and we have found that members have not read articles which should have been read by every member of the Society.

Subscriptions have increased markedly in the last year and we now have the following number going to various parts of the world.

Canada	234
United States	74
British Isles	10
Europe	42
Asia	16
South America	6
Miscellaneous	12
Exchanges	58

I desire here to acknowledge the great assistance of the French Secretary, Mr. H. E. Lefèvre, without whose help it would have been impossible to carry this important section of the magazine.

The T. Eaton Company Scholarships

The five T. Eaton Company scholarships awarded at the last convention were all taken up including the additional scholarship held over from the previous year. The recipients all undertook their work and I believe were successful. The appreciation of the Society for the total donation of $9,000. has been expressed repeatedly to the T. Eaton Company and a set of pictures of the men who received the scholarships has been prepared for distribution to the Company offices and Canadian agricultural colleges.

During the year the Society approached four possible sources of revenue for a continuation of scholarship funds. In each case there was no question about the value of such work but financial conditions were stated to be the cause of inability to provide funds this year. We have good prospects of receiving funds when conditions improve. No scholarships are, however, available for the ensuing scholastic year.

Text Book Club

The sale of agricultural books to members through the central office at a discount has continued throughout the year and this service has been very well patronized and seems much appreciated by members. The club operated at a loss this year owing to the fact that trade conditions in the publishing world are not of the best and the discount has in many cases been lowered. The Secretary is recommending to the Board of Directors that we lower the discount sufficiently to make this club self-sustaining.

Local Branches

The report of the Progress Committee announces the formation of three new locals, namely Southern Alberta, Montreal City and Ontario Agricultural College. At this convention we have also received and accepted an application to form a branch at Sherbrooke, P.Q. This gives us a total of twenty-one branches.

The locals constitute a vital part of the Society organization and every encouragement must be given to them to make their organizations and programmes attractive to the technical agriculturists of their respective districts. I wish here to acknowledge the loyal support during the past year of the officers of the various locals. Without this support the work of the new Secretary could not have been carried on. The local secretaries have been asked to do more than their usual work and have responded faithfully.

Travelling

During the past year the General Secretary visited all branches of the Society with the exception of the North Western Ontario branch which was not functioning at the time of the western tour last October. Care was taken to arrange for meetings and there were no failures in our plans. The President and General Secretary spoke at each branch meeting and were given a warm reception from coast to coast. A week was spent in the Maritime Provinces in connection with last year's convention and a week was spent in British Columbia visiting the three centres of their provincial organization, the Okanagan Valley, the University at Vancouver, and the Department of Agriculture at Victoria. A week was spent on the Prairies, and the Ontario and Quebec locals have been visited at opportune times.

All this has entailed an increased expenditure for travelling expenses, but it was felt legitimate in order that the new Secretary might become acquainted with the local organizations. The same amount of travelling will not be necessary during the present year. The railway companies have unofficially accorded the same courtesies as in previous years, thereby assisting in keeping travelling expenses at a minimum. It should be noted, however, that these privileges did not cover all points which had to be visited.

Group Organization

The Society has continued its close relationship with the group organizations already established and in addition this year is enjoying the coöperation of the Canadian Phytopathological Society in making our convention a success. A new group organization is being sponsored by the Ontario Agricultural College under the Chairmanship of Dr. R. Harcourt. It is hoped that this

group interested in soil science will form an organization which will be affiliated with our Society. This matter is also referred to in the report of the Progress Committee.

Standing Committees

I wish here to express my appreciation to the Standing Committees for their action in getting their reports prepared previous to the opening of the convention. This year we are adopting a new system in presenting these reports in the hope that it will permit the members to give them more careful consideration. It is felt that this is a distinct improvement over reading a report and immediately adopting it.

Headquarters

The continuation of the five-year agreement guaranteeing the rental of headquarters has been cheerfully carried out by the group concerned this year. Two years remain under this agreement. During the past year the registration book kept for visitors contains over four hundred names of those who have used these rooms. The maintenance of the very suitable headquarters which we now have is a distinct contribution to the welfare of the Society and one which members should always keep in mind.

Employment Bureau

The Employment service to members has been continued during the past year and several members have been placed in positions brought to their attention through this service. The Civil Service Commissioner forwards to each individual secretary of the branch organizations the lists of appointments available as soon as they are announced by the Civil Service Commission. The same list comes to the General Secretary and announcements and application forms are immediately forwarded to any who may be interested. In addition to this, commercial concerns continue to approach the Society in their search for technical men.

Grindley Memorial

After meetings of the Memorial Committee and discussion with local executives, it was definitely decided that the most suitable memorial of the late General Secretary to be prepared immediately would be a portrait to be hung in the Society headquarters. This was acceptable to Mrs. Grindley and we accordingly commissioned an outstanding Canadian artist, Mr. E. Wyly Grier, President of the Royal Canadian Academy, to paint the portrait. It was realized from the start that it would be a difficult task owing to the lack of material available from which to work. The work of guiding Mr. Grier in securing a suitable likeness was left largely in the hands of Mrs. Grindley and the General Secretary. No artist could have been more considerate and more painstaking than Mr. Grier. He has given us every consideration possible and it is owing to his skill and taste that the Society is now in possession of an exceedingly artistic portrait. There can be no question but that it is also a very characteristic representation of the late General Secretary, much more so than the photograph which was reproduced in *Scientific Agriculture* a year ago.

Reproductions of the portrait will be sent to those members of the Society who subscribed to the memorial fund.

The Eleventh Annual Convention

Plans for this convention which is the eleventh anniversary of the Society were well under way at the time of the Directors' meeting at the Royal Winter Fair last November. In fact much of the detailed programme had already been worked out and I wish, on behalf of the Society, to express our very great appreciation to the Ontario Convention Committee. The ladies and gentlemen on this committee have done a great amount of work and it is owing to their planning that such excellent arrangements have been made. To Dr. G. I. Christie and his staff, as our hosts, we desire also to express our appreciation of their great interest in the convention and their courtesy in entertaining us.

New Officers

Ballots for the annual elections were opened at Ottawa on April 20th, 1931. A total of 824 members voted. The following official results were announced through the Canadian Press and published in the May issue of *Scientific Agriculture*:

President—H. S. Arkell, Canadian Live Stock Coöperative Ltd., Montreal, P. Q.

Vice-President—G. I. Christie, Ontario Agricultural College, Guelph, Ont.

Vice-President—J. A. Godbout, Minister of Agriculture, Quebec, P.Q.

Honorary Secretary—L. H. Newman, Central Experimental Farm, Ottawa, Ont.

Office Work

The auditors' report contains a reference to a distinct improvement in the accounting system due to the carrying out of six recommendations contained in their statement last year. These resolutions have been carried out at the expense of over-work on the part of both the General Secretary and his assistant. Not only have they meant over-work but they have meant time spent on routine which should have been spent on expanding the interests of the Society. We acknowledge the justice of the auditors' recommendations and it has been a pleasure to carry them out. In passing we wish to pay our respects to Mr. Crawford and Mr. McLaine as most capable auditors and ones in whom the Society can place full trust to guard its interests. It is the desire of the staff that we carry out their recommendations to the letter and that we go even farther than they have recommended in connection with some of the accounts.

This chronic state of over-work which has characterized the office administration for the last few years is a matter which should be adjusted. The Society has distinctly outgrown the card index system established and a recommendation is going forward from the General Secretary and the auditors to the Directors that a suitable system be installed without delay. This is imperative to protect the interests of the Society in case of a complete change of office staff such as might conceivably occur again in the one year. Not only would such a system protect the Society, but it would relieve some of the pressure of routine work.

Finances

The financial statement for the past year is in your hands and should be carefully studied. The most important items are as follows: The chief feature of this report is that the credit balance has decreased from $6586.02 on May 31, 1930 to $3845.50 on May 31, 1931, an apparent loss on operating expenses of $2740.52. This is not the case, however, as $1050.00 of this amount was noted in last year's audit as being payable as follows: $600.00 scholarship balance unclaimed, and $450.00 bonus due the Grindley estate. A bonus of $200.00 was granted upon retirement to Miss Helen Henry for her faithful services to the Society, making in all $1250.00 uncontrollable expenditure included in this apparent decrease. The actual deficit of approximately $1500.00 is due in main to the following items: purchase of office safe, filing cabinets, new typewriter and folding chairs, $300.00. This expenditure will, of course, not need to be repeated for many years. The amount left is made up of the following increases in normal expenditures: travelling $300.00, printing magazine $400.00, cuts for magazine $250.00, loss on text book account $100.00, making a total of $1050.00. The increased printing is due mainly to the fact that we have more members, and subscriptions and are printing a larger number of magazines, but the increase in the cost of cuts is an item which is being discussed by the Directors. On the income side of the ledger the total receipts for advertising dropped about $850.00 part of which was made up by securing increased grants from governmental sources. The biggest individual loss was the grant of $600.00 which has been given by one company for expenditure on clerical assistance. This has been gratefully acknowledged from time to time and we realize that it is only changing economic conditions which have necessitated the permanent withdrawal of this grant. While we show a considerable drop from the unnaturally inflated credit balance of May 31, 1930, we still show an increase over the credit balance of 1929. There are many organizations which can not show an equally sound condition this year. The expenses will be watched carefully to avoid dropping below the present credit balance as this amount is practically necessary for the monthly financing of the Society. The accounts outstanding show somewhat larger than last year but this is due to one or two changes in the system of giving grants by the departments and also to some fairly large provincial text book accounts which were outstanding at the time. A large part of these accounts receivable was received in the first few days of June.

From time to time the late General Secretary stated in his annual report that, "any serious industrial depression would have a serious effect on our finances." We have survived the depression so far, and while close attention to the proof reading of several articles by our friends, the economists, has left us with no illusions regarding the immediate return of prosperity, there is every indication that a large number of our advertisers have confidence in the future. With continued aid from various institutions and governments, and with the loyal support of our members, we shall not only weather the storm but continue that steady progress which has characterized the Society since its inception.

MEMORIAL ADDRESS AT THE UNVEILING OF THE PORTRAIT OF FREDERICK HUGH GRINDLEY.

Dean E. A. Howes

Mr. Chairman, Ladies and Gentlemen:

It is a matter of deep regret that President Klinck and Dean Barton are not here tonight to unveil the portrait of our late beloved secretary, Fred. H. Grindley. Both of them were members of the staff of the institution from which Fred was graduated—Macdonald College. Dr. Klinck was the first president of our Society and Dean Barton was the third president. It is obvious that these gentlemen, along with our Honorary Secretary, must have been the most closely associated with Fred Grindley in the trying task of laying the foundation for our present strong organization. In the unavoidable absence of Dr. Klinck and Dean Barton I have been given the honour of unveiling the portrait and of saying a few words of tribute to the memory of the man who performed the most signal of services to the great work of scientific agriculture.

I presume that it is permissible that I indulge in a little reminiscence in regard to the early days of our Society in order to pay the tribute I am in a position best to pay. It is over eleven years—it does not seem so long—since I first heard from Fred Grindley. He wrote to inform me that a little group of men in the East had been talking for some time about the possible organization of those engaged in the work of technical agriculture—that they had decided to make a forward movement in the matter and incidentally that they wished me to undertake the task of forming tentative organizations in the three Prairie Provinces. Were it not that this occasion would scarcely be fitting I would give you an interesting story of my early experiences. Suffice it to say that I met with enough in the way of incident during my attempt to carry out the task set me, to give me a hearty and lasting conception of what Fred Grindley must have had to face in the way of meeting and dealing with opinions and suggestions that would in present-day light appear ridiculous —these in addition to the expectant and standard problems of conducting such a campaign as he planned. How well all the difficulties were met and handled needs no statement from me. Our present position, of which we are proud, is sufficient proof that someone carried on well. Who that somebody was, you and I have no mental reservation whatsoever. Very many of us have said—and Fred did not like to hear us say it—that Fred Grindley made our Society. My testimony is as follows: in the past I have been given some credit for services rendered to the Society—the fact of the matter is that practically little of this would have been performed were it not for the genial but persistent suggestion and urge of Fred Grindley. There are many of you who have freely formed similar testimony.

I wish to here second another opinion, perhaps a corollary of the other but also perhaps more emphatic. Fred Grindley made great sacrifice to put our Society in the proud position it holds today. I do not refer alone, nor in chief to the fact that he carried on many a time upon a ridiculously small stipend from our Society, firmly refusing to accept even that until all other claims were fully met. I wish chiefly to emphasize that he many times imperilled his bodily health and vitality—not always too robust—that the work

to which he was called might not suffer. Who can say in how far this devotion was the cause of his finally passing on from us? In his last letter to me, dated January 17, he said:—

"So many kind messages have reached me in the last month or so that I am almost staggered. What good friends you all have been. I cannot believe that I have done enough to justify the confidence and support and friendship of so many. But my appreciation is very sincere, and my determination to "Carry On" is made firmer, by the encouragement that comes from my friends. We'll let it go at that.

I shall soon be around again, merry and bright. Will get outdoors on the first fine day and be back at the office in a week. And then this chapter will be closed".

It was Fred's last chapter.

Friends and fellow-members, you believe as I believe that the path of the progress of mankind has been milestoned by the lives of those who, saving others, did not save themselves. Fred Grindley's milestone has been added.

ALLOCUTION A L'OCCASION DU DEVOILEMENT DU PORTRAIT DE FREDERICK HUGH GRINDLEY.

N. Savoie

Mesdames, messieurs:—

L'honneur que l'on me fait d'être le porte-parole des membres de langue française, en cette circonstance m'est très agréable, mais il met sur mes épaules une tâche difficile.

En effet, rappeler la mémoire de Fred Grindley dans les termes qui conviennent, nécessite une facilité de conception et de pensée avec lesquelles je ne suis pas familier.

Fred Grindley a été le promoteur, l'organisateur et l'animateur de notre société. Dès le début il en est devenu le principal artisan et le choix de sa personne comme secrétaire gérant s'est fait tout naturellement. Il s'est attaché à son oeuvre, il en a fait l'unique objet de ses pensés et s'est appliqué à établir la nouvelle association sur des bases stables et permanentes. Il était doué des qualités du coeur et de l'esprit qui mènent à la réussite des grandes entreprises. Possédant une bonne formation littéraire, un raisonnement sûr et pondéré, une largeur de vue qui le mettait au dessus des conceptions mesquines et intéressées, il s'est imposé, dès le début à l'attention des membres et n'a cessé de jouir de l'estime et de l'attachement de tous.

Je tiens particulièrement à signaler la confiance qu'il a su provoquer chez les membres de langue française. Pour plusieurs d'entre nous, Fred était, au début, un étranger. Dès le premier contact, il a créé une impression la plus favorable et cette bonne impression s'est maintenue jusqu'à la fin. Sa visite dans nos sections était un évènement agréable. Il écoutait les délibérations avec grande attention et ses conseils, qu'il distribuait avec tact et jugement, étaient toujours acceptés en bonne part. Jamais il ne heurtait de front une opinion contraire; il dissertait avec prudence sur le pour et le contre de telle ou telle idée et si cette opinion menaçait de compromettre la vie et la sécurité

de la section, ou de la société, il était habile à offrir une digression qui avait pour effet de rallier les plus récalcitrants.

Tous ses actes étaient empreints de sagesse, de justice et de loyauté. Il avait une vision claire et précise. Son idéal était placé au dessus des coteries mesquines et il poursuivait son but avec conviction, tact et persévérance. Il s'était fait un devoir d'apprendre notre belle langue et il éprouvait beaucoup de plaisir à nous faire part de ses progrès à chacune de ses visites. Il était pour chacun un conseiller et un ami. Il attirait par sa bonhommie et sa grande simplicité de manières.

Enfin Fred Grindley a été durant toute sa carrière de secrétaire de notre société un homme de paix. Il a servi d'agent de liaison entre l'est et l'ouest entre les membres de langue anglaise et ceux de langue française. Il a travaillé à une meilleure compréhension des aspirations et de l'idéal de chaque groupement, *à faire se mieux connaître les membres de tous les coins du pays.*

Messieurs, c'est là, à mon point de vue, le grand succès et le grand mérite de Fred Grindley: *"Assurer la vie et la permanence de notre société par une entente parfaite entre les différents groupements."* Nous avons tous nos goûts, nos aspirations ... et même quelques fois nos préjugés. Nous vivons dans des milieux différents, nos conceptions du bien et du vrai varient parfois quelque peu. Fred Grindley a su, par son tact, son jugement et son habilité, établir au sein de notre société une entente mutuelle propre à en assurer la permanence.

Notre idéal est noble et généreux. Nous avons su jusqu'à présent le maintenir au dessus des petitesses de la vie. Nos réunions annuelles sont empreintes d'un sens de dignité qui relève le prestige de notre société. Entre autres témoignages, je me permets de rappeler celui de l'honorable premier ministre de Québec, Mons. Alexandre Taschereau, qui nous disait après la convention de Québec, en 1928:—"Qu'il n'avait jamais rencontré un groupement aussi digne, aussi mesuré dans ses actes et aussi intéressant que celui des membres de la Société des Agronomes Canadiens". C'est là l'idéal que s'était fait Fred Grindley de notre société et auquel il a travaillé avec persévérance pendant son terme d'office.

Au nom des membres de langue française, j'apporte ici ce soir, l'hommage de notre profonde estime, de notre fidélité à sa mémoire et à l'idéal qu'il avait conçu.

Membres et amis, inclinons-nous devant cette belle figure de notre société et déposons au pied de ce portrait l'hommage de notre attachement à la mémoire de celui fut notre premier secrétaire gérant et l'âme inspiratrice de notre société, *Fred-H. Grindley.*

AN APPRECIATION OF THE SERVICES OF FREDERICK HUGH GRINDLEY.

Dean H. Barton

In these days of advanced development it is not given to many of us to perform a pioneer service, a pioneer service to all one's co-workers, to a body of trained people, to the country's greatest national industry, and to

society. Fred Grindley had the faith, the courage, and the resourcefulness of the pioneer; the loyalty, unselfishness and devotion of the true friend; the understanding and appreciation of the trained mind; the conception and vision of national outlook; and he had the spirit of service.

Some of you may not be familiar with the early history of the Canadian Society of Technical Agriculturists, in which Grindley played the leading part. For those of us who were associated with him it seems natural to recall at this time not only the progress of the Society under his guidance, but also the difficulties of the task he undertook in creating it, and the miraculous manner in which he surmounted them. The germ of the Society first appeared in Ottawa some ten years ago, its beneficial properties were recognized there at that time, and it was developed in culture by a group of three in that city during the winter months of 1920. Before its propagation could be assured, it was necessary to inoculate a considerable number of individuals in whom it was likely to become active. This done, the next step was to establish the organism throughout the country. The resistance proved higher than had been supposed; many of those engaged in agricultural service were not society minded, others pointed with complacency to the membership they already held in the strictly scientific societies of American and other associations, and some questioned the motives of those who were introducing this new form. It fell to Grindley to make most of the inoculations and this he did with consummate skill and unceasing zeal. His genial greeting and warm-hearted friendliness never failed to break down any barriers there might be to his approach, his good fellowship entrenched him in the hearts of everyone, his efficiency inspired confidence and his persistence could not be denied: so he succeeded in planting widely the germ of an organized profession for agriculture in Canada, and in nourishing it to a healthy vigorous growth.

There were various conditions and circumstances which militated against the early progress of the society and greatly embarrassed those who were charged with the responsibility for it. That hardy perennial of small salaries in the agricultural section of the Dominion Civil Service was particularly noxious during 1920 and 1921, and was receiving slightly more than the usual notice. It was to be expected, therefore, that the purpose of any movement to organize the oppressed would be construed as a raid on the Treasury. At the organizing Convention in 1920, it was decided to publish a magazine, and for this and other undertakings money was urgently needed. After much discussion and some disagreement, the convention decided to ask the Dominion Government for a grant of $2,500, a grant which there seemed some reason to believe the Government would be glad to make. The confidence of the C.S.T.A. in the Government was not justified and the officers of the society were obliged to recast their budget. The first issue of the magazine was delayed until January 1921, following an arrangement with a publishing firm in Ste. Anne de Bellevue, whereby the Society was to furnish the material and edit it, the publishers to print it, handle the advertising and receive the revenue. This arrangement lasted for six months; six issues of *Scientific Agriculture* appeared and were well received. The industrial depression

of 1921, however, forced the publishers to curtail, and *Scientific Agriculture*, at that time a poor revenue producer, was placed on the suspended list. Nothing daunted, Grindley set about evolving other plans. He developed a special advertising policy which, despite the time and conditions, and in the face of failure by the advertising service of the publishing firm, he sold to leading advertisers in Montreal and elsewhere. The contract with the publishing firm was cancelled, and in September of that year *Scientific Agriculture* again appeared, and has continued to appear since that time under the statement, "Published monthly by the Canadian Society of Technical Agriculturists". Grindley left the magazine to us, an unique and first class publication, a growing asset of the Society. The story of the magazine is the story of other features in the development of the C.S.T.A. The editing, publishing, advertising and managing of *Scientific Agriculture* constituted but one of many duties discharged in like manner by Grindley, and these for some years without an office, without regular stenographic assistance and at times without funds for either operation or salary.

His achievement record in the space of ten years is not an easy one to chart because often the greatest values remain for a time the most intangible; only those with the closest contact can appraise them. We may all point with satisfaction, however, to the membership registry, practically a complete list of those eligible; to the increased acquaintanceship and association among those serving agriculture, from coast to coast, many in similar work, facing similar problems, hitherto unknown to each other; to the better understanding and more active co-operation among individuals and between units formerly isolated and not infrequently engaged in competition or needless duplication; to a greater professional sense and improved status without which no profession can hope to advance; to collective consideration of agricultural policies, education and research, from which has come directly and indirectly guidance in many forms; to the development of groups with special interests and the facilitating of co-ordination and joint effort in their respective fields; to a Who's Who in Agriculture; to a magazine of high character, with many subscriptions from foreign lands and enjoying the support of educational institutions, scientific societies, Departments of Agriculutre and Canadian Industry; to a multiplicity of services to individual members; and to suitable offices and appropriate headquarters.

We must now realize that the Society has entered a new era; the pioneer period is over. It is now for us to use the resources we possess in building a better agriculture. Those of us who at times are apt to say, what is the Society doing for me, must ask ourselves, what can I make the Society do for agriculture.

All colleges like to point with pride to their illustrious sons. Macdonald is proud to claim Fred Grindley, who served all colleges, as one of her first graduates. May it not be said of him in the words of Matthew Arnold:

> Somewhere, surely, afar
> In the labour sounding house vast
> Of being, is practised that strength—
> Zealous, beneficent, firm.

REPORT OF THE C. S. T. A. COMMITTEE ON PROGRESS

W. V. Longley, *Chairman* *

Organization of New Locals

In the report of the Progress Committee presented at the Tenth Annual Convention at Wolfville reference is made in the first paragraph to one limiting factor of progress in the Society as follows: "The one great handicap of many locals is the great area over which the membership is spread making it impossible to hold regular meetings that will be well attended. In some provinces practically all meetings are held during fairs or conventions when there is likely to be a gathering of the clan."

This situation was taken into consideration by the President and General Secretary during their visits to local branches during the past year. Not only was the matter of distance taken into consideration, but also the diversification of interests of groups of members due to their location at research and teaching points in contrast to administration and commercial points. After meeting with these two types of groups it was felt that greater interest would be maintained if members were able to build up locals which would furnish the type of programme desired.

After due consideration permission was given to form new branches at Calgary, the Ontario Agricultural College, Montreal and Sherbrooke. The first three locals have been formed and the fourth is under consideration. While it is not thought advisable to suggest that we organize several new groups, it was felt that in these particular cases, conditions amply justified the decision of the Dominion Directors. It should be pointed out that in no case will these new groups involve a loss of membership to the Society, but rather, an increase in membership due to the greater interest which can be aroused by distinctly local units.

Activities of Locals

The C.S.T.A. has continued during the past year to make progress not only as shown in the increase in membership but also in the activities of the various branches. There has been a very satisfactory increase in membership with very few dropped for nonpayment of dues. A questionnaire to secretaries of the seventeen branches resulted in replies being received from fourteen. These report a total of 92 meetings held. The activities of the locals are varied, depending to some extent upon the proximity of their members. Some of the locals have their members so scattered that frequent meetings and other activities are not practical. With such locals one meeting a year, possibly a summer conference, often comprises all of the activities. Other locals hold regular monthly meetings during the full year or at least during the winter months. One local reports nine noon day luncheons, one debate, one mock parliament, a bridge dance, and weekly bowling, the latter having been held since the first of October. Another local reports weekly noon day luncheons. The meetings tend to include not only regular business but speakers and often social affairs as well. There is apparently

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a decided tendency to make a greater use of the meetings for the discussion of the work of the C.S.T.A. and particularly that relative to committee assignments, thus tending to crystalize opinion back of the committee members' reports.

One local secretary reports that the non-graduates in the Colleges are very much interested in the activities of the C.S.T.A. but that the difficulty in their local has been that many of the older members are not apparently so infused.

Suggestions for the future, include more meetings, seminars, summer conferences, exchange of local news, monthly meetings, and more social activities. One local suggests that means be furthered for the purpose of broadcasting research information. Another local secretary writes as follows: "I feel that if some of the general committees of the C.S.T.A. could put before our local a certain definite topic for discussion that we could make greater progress than we have been doing in the past. My reason for this is that the matter of extension has raised a tremendous amount of interest in this local, simply as the result of its being brought to the attention of the local from the central committee."

Group Organizations

Progress is to be reported in the development of group organizations within the C.S.T.A. At our last Convention the following groups had separate sections, namely: Horticulture, Agronomy, Agricultural Economics and Animal Production. The Eastern and Western societies of Animal Production and the Canadian Society of Agricultural Economics are official organizations. The Phytopathologists have developed their own organization separate from the American Branch. Plans are under way for the organization of a Canadian Soil Science Association. We believe that the group organizations should be given every encouragement for their development within the C.S.T.A.

Functions of the Committee on Progress

The question might well be asked, what is the function of the Progress Committee? It is herein taken that its work includes not only the reporting on progress made but also that of suggesting plans for the future. It is in accord with this delineation of its field that the following recommendations are made.

1. *Organization of Agricultural Work in Canada.* We commend the excellent work which has been done in the four years of its existence by the Agricultural Policies committee. Its report, adopted at the 1929 Convention, was a very definite contribution to agricultural thought in Canada. Other annual reports have tended to further elaborate this report. While much has thus been done to delineate the spheres of the dominion and provincial departments of agriculture and of the various branches and divisions, still we believe that there yet remains much to be done.

There are matters relative to the working out of an Agricultural Policy for Canada which may require defining more clearly the work of the Federal Department of Agriculture. The Experimental Stations and Farms, the Provincial Departments of Agriculture and the Agricultural Colleges. The

reports of the C.S.T.A. Agricultural Policies committee have done much to state our position. Duplication of Agricultural work in Canada should be reduced to a minimum and the C.S.T.A. is, we believe, in a position to assist in the working out of policies that will aid in securing this result. Additional work on the part of the C.S.T.A., in furthering coördination of organization of agricultural work in Canada, is recommended.

2. *Agricultural Policies.* The present period of depression tends to emphasize the need of definite objectives for Canadian agriculture. The question not only of coördination of agricultural work in Canada but also of policies to be furthered requires study. We are interested in such policies as an organization because of the fact that our membership is to a large extent composed of men who are actively engaged in departments, organizations and institutions that are in some degree interested in the furthering of such policies. Some of our members are engaged in research, seeking to work out problems affecting Canadian agriculture, others are in organization work, others in institutional teaching, but all, regardless of their positions are vitally interested in the furthering of Canadian agriculture and in seeking to see it continue as the outstanding industry in Canadian national life. Agricultural work has progressed largely as definite policies have been established and placed in effect, and it is in those lines of agricultural endeavor where Canada has developed definite policies that we are in the forefront today.

What is the future of agriculture? Are we going to confine our production to our home markets or are we going to further production of certain commodities for export? There are those who would correct the ills of specialized farming, whether it be on the prairies or in our potato and fruit districts, by advocating mixed farming. Many proposals have been offered and are being furthered as remedies. Are these proposals sound? Members of the C.S.T.A. are often the men who will be looked to for the working out of these policies. It would appear to be the logical procedure for this organization to further the study of the development of National Agricultural Policies for the Dominion and for the various agricultural districts.

The working out of more definite policies would, we believe, do much to clarify public thinking, tend to make for constructive work and aid in preventing the furthering of inadequately prepared policies and wrong aspects on certain national agricultural questions, such as are often in evidence.

It may be that proposals covering certain branches of agriculture should first come from the group organizations that represent them. It would appear, however, that viewing Canadian Agriculture as a whole, some guidance and perhaps some leadership might be given by this Society in shaping the development of policies, and that similarly in the provincial and district fields, the provincial and local units should have some useful service to render.

3. *C. S. T. A. Committees.* The work of the C.S.T.A. committees this year has tended to point to the need of a clearer defining of the work of the various committees. Thus we have the committees on Agricultural Policies and Educational Policies covering to some extent the same field. The report of the committee on Progress includes certain recommendations that

have to do with the committee on Agricultural Policies and which if adopted may be referred to that committee.

At the convention a year ago a recommendation was made that the committee on Progress be dropped as matters covered were very largely overlapping with the work of certain groups and committees.

It is therefore recommended that the executive take under consideration the better delineation of the work of the various committees and thus aid in preventing duplication of effort.

4. *Representation on the Senate of Provincial Universities.* Representation by professional societies on the Senate of provincial Universities is now an established fact in several provinces. This brings up the question of like representation by the various locals of the C.S.T.A. The parent body is now incorporated under the statutes of the Dominion of Canada and it is here recommended that approval be given for the incorporation of such locals as may find it desirable in order that they may be represented on the Senates of their provincial Universities. While not a problem for all branches, it is for others. It is recommended that action on this question be left to the various locals and that where so desired by them such representation be sought .

W. V. Longley, Chairman.
J. MacGregor Smith
A. E. Richards.

REPORT OF THE C.S.T.A. COMMITTEE ON AGRICULTURAL POLICIES.

E. A. Howes, *Chairman**

The Committee on Agricultural Policies has already presented four reports. Throughout these reports a certain classification has been observed in regard to the fields surveyed and discussed. The work of survey and discussion was applied respectively to the three fields of teaching, research and extension. Very little time was spent in connection with the field of teaching—not more than enough to connect it up with the other activities. The reason for this was because the Committee on Educational Policies had presented a very detailed report in connection with this field. As far as our report was concerned it contained sufficient to establish that with but one, or at most two exceptions, there had been no invasion of Provincial rights and practices in the matter of institutional teaching. In the field of Research it was recognized that there was room for considerable investigation and a check-up on organization with the possibility of some recommendations later on. In the Field of Extension we endeavoured to establish some line of demarkation between true Extension and that which was really promotional field work. It might be proper here to say that we were not successful in securing recognition for this line of demarkation and, since many of our oldest members insist on calling the whole field that of Extension, it

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may be well to how to usage and employ this term here for purposes of discussion.

In the first and second reports, we rather confined ourselves to a consideration of activities respective to the Federal Department of Agriculture and to the different Provincial Departments of Agriculture. In our third report, and more noticeably in our fourth report, we gave recognition to the fact that activities in Agriculture went far beyond those of Government organizations and that particularly in the field of Extension many institutions and organizations were taking an active hand. The four reports will be dealt with individually for the purpose of preparing a synopsis of the details, in a somewhat concise form, so as to form a record of findings to date.

1927

The work of the Committee during this year was entirely devoted to the problem of survey and, as indicated, had to do only with the relationship between Federal and Provincial activities. The following points seem to have been fairly well established as representative of conditions in 1927:

(1) It was definitely established that the relationship between Federal and Provincial activities had not been the result of any policy, but rather of the absence of such. It was stated that in many cases "each line of activity owed its inception to its possible value in making public impression at that time."

(2) In the realm of investigation work there also appeared to be no well-defined policy. The Federal Department of Agriculture had been the pioneer in this field, but it was recognized by all that Educational institutions must carry on investigation work if they were to survive. It was intimated that the investigation work carried on by these educational institutions should be confined to the needs of educational activities. This was merely a statement of a principle, rather than any attempt to make an exact definition. The question of duplication in the matter of investigational work did not seem to be a pressing one. Indeed it was generally conceded that more replication with some of the problems under investigation would be desirable. Then, too, the field of investigation is so large and there is so much to do that it was not felt that there was much waste in time and effort to date.

(3) It was quite apparent from the first that the field of Extension was the one requiring closest observation and study. It was shown that the relation between Federal and Provincial activities varied with each Province and had been the result of no defined policy but rather the development of expediency. Some Provinces reported no clash in field work, others reported definite conflict of interest. One or two were quite specific in stating where the conflict existed. There were two cases of refusal to make a statement.

(4) It was quite apparent that the term coöperation, as applied to the respective activities was "an over-worked term for a nebulous idea". It was quite apparent that, at that time, the word coöperation was used rather loosely. It was discovered, however, that in many cases in several provinces there had been definite attempts at working together, this being demonstrated by,

(a) Preliminary mutual discussion.

(b) Collaboration in the establishment of laboratories.

(c) Some joint work in crop tests.

(d) Joint action at public meetings.

(e) Provincial seed boards.

(5) It was shown that in both investigation and extension work there was need for more coördination so as to eliminate the danger from the pronouncement of conflicting opinions. It was felt that investigational work offered great possibilities for coördinated effort. In connection with extension, there seemed to be an indication that some form of Provincial organization that included both Federal and Provincial officers should be brought about to guide all extension activities.

1928

The report of 1928 has been called a report of opinions and this report was still confined to a discussion of the relationship between Federal and Provincial activities. Introductory to this report the following statement was made:

> "Any thoughtful student of the report of 1927 will agree that that report settled once and for all the fact that there is room for improvement in the relationship between the respective departments in their work of service to the people—who in the ultimate analysis ask for this service and expect to pay for it. The student will be struck also by the fact that it was clearly shown in the report that the relationship was not the same with all provinces, despite the information withheld by members of the committee who did not feel just free to express opinion. The other fact that seemed to stand out is that the report showed that there has not been any defined policy of relationship and that there is a need for such a policy—that will, as far as is materially possible, remove from the shoulders of the workers a reasonable share of the onus for maintaining harmony and for giving definition. The report showed, too, that while there is little difficulty in the realm of teaching, there is need for the meaning of the word to be defined; that there is urgent need for coördination in the field of research; that there is material conflict here and there in the enterprise of field work."

A certain number of questions were sent out and the following quotations are taken from the answers:

> "The Federal Department of Agriculture should have administrative jurisdiction in matters of national interest and of national application such as the quarantine and control of agricultural imports, both animal and plant; the establishment of grade standards for export and domestic trade for agricultural products and their application to crops and animals and their respective products, including the grain trade of Canada; the supervision of public marketing facilities such as stock yards, abattoirs and grain elevators; the standardization of materials sold for use in agricultural production, as seeds, fertilizers.
>
> Its research activities should likewise apply to projects of Dominion-wide application such as wheat stem rust and other plant diseases, investigations of entomological and bacteriological problems common or liable to be common to all of the provinces or a number of them.
>
> Its promotion work should be carried on mainly through provincial agencies, but the valuable work which is being done in behalf of agriculture should not be withheld or prevented from reaching the public. It should issue bulletins and reports and make exhibits from time to time to acquaint the public with its work. Provincial jurisdiction should apply in the administration of local production problems. The provinces should conduct research and experimentation in problems of local interest, and conduct agricultural teaching and instruction both institutional and extramural of an extension or field promotional nature.
>
> (a) The broad question of Federal and Provincial fields of work could be discussed in a meeting of Federal representatives with representatives of all the provinces but:

(b) Specific instances of coöperation or overlapping would necessarily have to be discussed province by province as these instances vary in different provinces depending largely on the legislation of the different Provincial Governments, and the activities of their Departments of Agriculture. The work of the Federal Department of Agriculture is much the same in all the provinces though influenced somewhat by the Provincial Department activities.

Experimentation and research cannot be considered an exclusive function of either the province or the dominion. At the Federal experimental farms and branch laboratories, work of this nature is well established and is filling an invaluable place. Under the auspices of the provincial universities, agricultural colleges or Departments of Agriculture, similar work is going forward. Such work is the inspiration of all our activities in technical agriculture. Without it we could not retain men of the calibre required in the service, and extension work would be deprived of its vitality and usefulness. The suggestion that the research work done at teaching institutions should be 'confined to the needs of teaching' fails to take into account that the training of research workers is a most important function of agricultural colleges. In order to train the research workers of the future, it is essential that, during their years of training, they should be brought into contact with research workers of the highest type.

I consider coöperative marketing of agricultural products a matter which should be dealt with almost entirely by the farmers themselves. Certain fundamental educational work is apparently needed toward stimulating a keener interest in this line of modern economics and such educational work should be done largely by Provincial Departments and Universities. Nevertheless, actual organization of coöperative marketing and administration thereof should be entirely in the hands of the growers and receive little or no assistance from governments. In this way only does the grower fully appreciate the true significance of and reasons for continuation in coöperation.

I agree that teaching is essentially a Provincial function and the North America Act clearly defines Federal and Provincial activities in this regard. Needless to say, Federal institutions, acquiring information through experimental research work, all appreciate that Provincial educational institutions offer by far the best channel through which to take such information to the farmer. For this reason, more each year, we find Federal research men in certain phases of work located at Provincial Universities, while other Federal investigators give freely of their time, on request, to the Universities and in speaking at meetings organized by the Provincial or University officials. Needless to say, however, such men should not be in any way prohibited from the distributing of such information through other channels to the taxpayers demanding the same.

I believe that local groups or committees in the various provinces as needed and representing Federal and Provincial workers in that particular field, bring about personal contacts and confidence which large inter-provincial organizations fail to do. It is only by mutual confidence and understanding that workers in any one institution learn to be mutually most helpful and work to the greatest benefit of the industry. That being true, it is imperative that men in Universities, Provincial Departments of Agriculture, and any Federal men working in each province, establish and maintain personal confidence.

Further group organization which may be largely fostered by the C.S.T.A. will guarantee maximum coöperation and eliminate such over-lapping as may exist. Above all, it will eliminate the frequent exaggerated statements as to "Unnecessary expenditures in agricultural work through great over-lapping.

1929

The report of 1929 was based upon the surveys made in the two previous years. The following recommendations were submitted and approved:

"1. That institutional teaching shall be the exclusive duty and responsibility of the Province. That the extension of agricultural teaching pertaining to production shall likewise be the duty and responsibility of the Province and ought not to be undertaken by any officers of the Federal Department of Agriculture unless and until the approval of the Minister of Agriculture or Minister of Education for the Province has been obtained.

2. The development and control of inter-provincial and international trade and commerce shall be the exclusive duty and responsibility of the Federal governing body. The development and control of intra-provincial trade and commerce shall likewise be the duty and responsibility of the Federal governing body in so far as Federal laws may apply. The dissemination of information

pertaining to inter-provincial and international markets, the quantity and quality requirements of markets; the Federal laws, regulations and standards; and the results of investigational or research work done under the direction of the Federal government shall be the duty and responsibility of the Federal governing body.

3. The interprovincial and international control of diseases of animals and plants and of insect or other pests shall be the exclusive duty and responsibility of the Federal governing body. The intra-provincial control of diseases of animals and plants and of insect or other pests shall be the duty and responsibility of the Federal governing body in so far as Federal laws may apply.

4. Investigational or research work pertaining to matters or functions that are of themselves the duty and responsibility of any one governing body shall likewise be the duty and responsibility of that body. All institutions for higher education shall not, however, be subject to any expressed or implied limitations as to any investigational or research work on subject matter that may reasonably be included in any of its major courses of prescribed studies.

Investigational and research work in general shall be the privilege and opportunity of provincial governing bodies and colleges; and the duty and responsibility of the Federal government to conduct either directly or through the medium of agencies not under its immediate direction.

5. Coöperative endeavour in the marketing of farm products or the manufacture of agricultural products or in the purchase of supplies ought to be regarded as the opportunity and responsibility of the farmers and the organizations that they voluntarily form for that purpose, but the extension of teaching the principles and practices of coöperative endeavour to farmers individually and collectively shall be the duty and responsibility of the Province. The establishment of centers for receiving, conditioning, assorting, packing, grading, storing and shipping on orders from the owners of farm products intended for interprovincial or export trade shall be the opportunity and responsibility of the Federal governing body as a service that may be provided to the public in general and to farmers coöperatives in particular.

6. That thought and study be given to the all-important question of the establishment of definite ethical standards in the matter of publicity and propaganda in connection with agriculture."

1930

In the report of 1929 recommendation No. 6 was approved to allow the Society to investigate other activities than those of Federal and Provincial.

In the report of 1930 will be found a statement as to the work done in the Province of Saskatchewan in organizing a Saskatchewan Agricultural Committee, "to effect an organization within the Province of Saskatchewan which will embrace the field of agriculture and serve to coördinate the activities of as many organizations as possible." This scheme was recommended to the various locals for purposes of study during the following year.

Division 3 of the 1930 report frankly discusses the entrance of many institutions and organizations into the field of agricultural extension, so-called. The following extract from the 1930 report deals with this problem:

"Heretofore we have been discussing policies as implemented by the various departments of agriculture—Federal and Provincial. Some of our correspondents have pointed out that while teaching and research have been almost entirely handled by government agencies, the other great activity, which in our reports we have called field work, as being rather broader than extension, have been invaded by many institutions which we may describe as private. One writer points out that the following types of institutions are active in agricultural field work:

(a) Coöperative organizations.
(b) The press.
(c) Banks—through local branches of larger organizations.
(d) Technical societies.
(e) Commercial companies—seed firms, machinery firms, merchandise firms.
(f) Railways.

(g) Fertilizer manufacturers.

(h) Malting companies.

This may not be a complete list, but it is fairly comprehensive.

It has been suggested from many sources that the C.S.T.A. might do something to coördinate the activities of these institutions. It might be well at the present meeting to give some attention to this problem and so, to lead the discussion, the following suggestions are offered:

(a) Where business companies of different types are interesting themselves, sometimes at considerable expense, to disseminate technical information in agriculture, it would be well for our Society, either through its local or through provincial committees, where such exist, to establish a liaison with whatever private institutions may be desirous of public agricultural service and offer such advice as may seem logical and necessary. If the advice be not taken there is not much that can be done about the matter, but in the most cases we believe such advice would be welcome.

The committee, or committees, in each province in giving advice would have to study carefully such points as the motive that prompted the proposed service, because manifestly the degree to which the altruistic might actuate proffered service would vary considerably. It is patent that some of it could not be considered as much more than a rather good type of advertising, some of it would be a sort of logical outcome of other activities of the institutions concerned; while, in a few cases, the offer of such service would be to a very large extent disinterested.

(b) There is a specific problem in connection with the press. The press has for many years been a great factor in carrying agricultural information from the technical agriculturists to the farmer and has also been of great service in making vocal the many needs of the farmer, and incidentally, also, of the technical agriculturist as well. Not only do we recognize this great service, but we are deeply grateful for it. Because of this, one approaches, with diffidence, any attempt at criticism, however constructive. Nevertheless, the Committee is of the opinion that the better newspapers and periodicals would welcome the offer of advice from committees representative of the large teaching and research institutions. Some system could surely be established whereby the provincial committee just mentioned, or the nearest local member of that committee, might advise the press as to the proper authority to pronounce upon statements and recommendations that, in the ultimate analysis, must have a very important influence on agriculture in general."

It is plain, then, that the report of 1930 dealt with some means of coördinating the different activities engaged in the business of studying agricultural problems and of giving advice to the farmers.

It was inevitable that the work of the Committee on Agricultural Policies and the work of the Committee on Educational Policies would in itself provide an example of overlapping. In the first place, the Educational Policies in a broad, general way, are chiefly agricultural in their purpose. On the other hand it is a common practice to state that most of our agricultural practices are educational though this has been sometimes subjected to adverse criticism. It was inevitable that in the progress of the work of the Committee on Agricultural Policies that a certain amount of attention would necessarily be paid to policies that might readily be described as educational.

E. A. Howes, Chairman.
F. H. Auld.
J. B. Fairbairn.
H. Barton.
E. S. Archibald
G. H. Clark
C. F. Bailey.

REPORT OF THE C.S.T.A. COMMITTEE ON EDUCATIONAL POLICIES.

L. S. KLINCK, *Chairman* *

During the past year the Committee on Educational Policies has confined its activities largely to an investigation into the educational problems which confront extension men.

In making this report, the Committee is desirous that its work be considered in the nature of a progress report which attempts to present a digest of the main features brought out in views received from local units throughout Canada. In doing this it has been more or less impossible to maintain a clear line of demarcation between the work of this Committee and the work and activities of the Committee on Agricultural Policies.

The Agricultural Policies Committee, as far back as their 1927 report, in discussing the relationship between Provincial and Federal agencies, drew attention to the fact that it was quite apparent from the first that the field of extension was the one requiring closest observation and study. They had shown that the relation between Federal and Provincial activities varied with each Province, and had been the result of no defined policy, but rather the development of expediency. Some Provinces reported no clash in field work, others reported definite conflict of interest, and one or two were quite specific in stating were the conflict existed.

The Committee discovered great need for more co-ordination in extension work so as to eliminate the danger from the pronouncement of conflicting opinions, and indicated that some form of provincial organization, that included both Federal, Provincial and University agencies should be brought about to guide all extension activities.

On examining further into this phase of the work, after it had pointed out that there was in many cases no definite policy of relationship and that there was material conflict at various points between the different agencies, the Committee concluded that extension services should be mainly the work of institutions within the confines of each individual Province, and laid great stress on the necessity for the proper maintenance of maximum co-operation and of mutual confidence and understanding between all workers to achieve the general well-being of the agricultural industry. It further called for a defined policy of relationship to remove from the shoulders of extension workers a reasonable share of the onus for maintaining harmony and for giving definition to their field of activities.

Arising out of and following the valuable work already accomplished by the Agricultural Policies Committee, the Educational Policies Committee, as already indicated, undertook its investigation into the work, status, and needs of extension men in our system of agricultural education.

The terms "extension men" and "extension work" are capable of rather a loose application to different kinds of workers and to different types of work. It is the intention and purpose of this report to regard the typical extension man as the person who is generally known as the Agricultural Representative or District Agriculturist, and who is commonly referred to in the United States as the County Agent.

* President, University of British Columbia, Vancouver, B.C.

Extension work consists chiefly of the effective dissemination of information which contributes to the progress and welfare of those engaged in or interested in the agricultural industry.

For the sake of clarity it is the purpose of this report to consider the problems of extension men and extension work from several aspects, viz:—

1. Organization of extension workers.
2. Conditions for Effective Extension Work,
3. Technique of Extension Work,
4. Sources of Information for Extension Workers.
5. Training of Extension Workers.

While each phase of this problem may be considered under its respective heading, it is apparent that many of the points are inter-related and discussion on them is not capable of being confined to, or fully covered by, any one particular heading.

1. Organization of Extension Workers

The general practice throughout all the Provinces at the present time is to have the work of district representatives centered in, and administered by, the Provincial Department of Agriculture. In some cases provision is made for one definite director of extension at the head of these operations; in other cases extension work seems to be absorbed into the general administrative routine of the Department. This latter situation has come in for much adverse criticism as it tends to leave the extension worker without considered and adequate direction in his work. So situated, he has to create and administer the work in his district largely on his own initiative with no central authority properly to consider his work and to guide him in method and procedure.

While there has been no suggestion other than that the responsibility for extension work should rest with the Provincial Department, there has developed a marked opinion that this work should be administered from the University or the Agricultural College rather than from the Department of Agriculture. To quote: "Our local branch takes the view that the district representative work of an educational nature could be much better administered from the Extension Department of the Provincial University. The agricultural policy throughout the Dominion has not favored this plan with the result that much confusion exists at the present time and the efficiency of extension work from the educational standpoint suffers greatly. This is in sharp contrast with conditions in the United States where the County Agent work is attached invariably to the University or the State College."

While in many cases there was admitted overlapping of work and so-called "duplication of effort", and in other cases there was a lack of coördination, there was a general tendency to shift the blame for this to the governing authorities higher up who, on the inauguration of work, often failed to take the necessary steps to plan and divide the enterprises entered upon so as to avoid these difficulties. The man in the field felt that much of this could be overcome by suitable conferences and understandings before the work was taken in hand. The onus for "a defined policy of relationship" so strongly

called for by the Agricultural Policies Committee, lies squarely on the shoulders of the directing authority.

2. Conditions for Effective Extension Work

The agricultural representative should be situated so as to have permanent and easy contact with his community, and his field of activity should not be made so large that effective work is precluded. Personal contact certainly ranks first as a means of social and economic betterment.

His salary should be adequate and sufficiently stable to insure a reasonable degree of permanency. In his case there is a close relationship between working efficiency, adequate remuneration and permanency of appointment.

In some cases there is a tendency to attach cheap and petty political motives to some of his activities. An agricultural representative should receive full protection from his governing authority against political interference and the adverse acts of political expediency.

The agricultural representative should also be recognized as the agricultural advisor of his district. To quote: "The prestige and effectiveness of any field man will be enhanced greatly if all institutions take full cognizance of his presence in a district, appreciate his problems and his difficulties, keep him informed on their interests, discoveries and activities, and direct their efforts towards whole-hearted coöperation with him.

It would seem desirable to have all institutions or their representatives cooperate with the district representative through approved channels when conducting agricultural programmes in his area. This would enable him to participate in and keep informed on all institutional activities and investigations which affect his territory."

Developing this phase of the question another C.S.T.A. unit states: "The Agricultural Representative is the man through whom practically all extension work is carried on. He is supported by so-called extension or subject-matter specialists attached to various departments of the Agricultural College, the various Experiment Stations, and branches of the Department of Agriculture, besides field promotion officers of the Federal Department of Agriculture."

A third local goes still further and states in substance that where an Agricultural Representative is employed he should be in charge of all work in his territory. Specialists and others should assist on his request or, if a definite project is to be undertaken, the Representative should be in accord with the programme and should assist in giving it effect.

It is apparent that, as the work becomes centred in the agricultural representative, radical changes will be necessary in the organization of many of the Provinces. While the extent to which centralization should be carried is a matter of opinion, the adoption of this general policy would overcome the difficulties existing in some of the Provinces where controversy, confusion and ill-directed effort result from the practice of ignoring the district representative.

3. Technique of Extension Work

Despite the fact that a great amount of work has been done on this subject, and quite elaborate studies of extension methods have been made,

there is still much need for the application of proper technique in many of the Provinces. While different methods vary under different conditions, and each Province must determine its best procedure, there is much valuable technique having a general application that is still ignored.

To quote: "The greatest advancement has been made during the past few years when representatives have had as a major project:—

(1) The preparing of an agricultural survey or analysis of their county or district. (2) The working out of an agricultural development programme based on the findings in the survey and covering a period of years with objectives specifically defined. (3) The planning of a work calendar by months.

"We feel that this procedure will result in our extension men becoming familiar with all factors affecting the economic and social welfare of their farmers, and then attacking those which are of major importance in a systematic, definite manner."

This condition, however, is by no means general throughout Canada. In many cases, extension men must undertake their tasks without special training or other qualifications on which to base their efforts or establish their thinking. There is, therefore, urgent need for information based on scientific study and practical experience for the guidance of those engaged in extension work.

4. Sources of Information for Extension Workers

In dealing with this point one report reads as follows:—"New developments in agriculture, produced through economic changes, research, experimentation and observation, tend to crowd in upon his time. He finds himself unable to delve through the volumes of literature that are constantly coming off the press. He has to cover a wide field of activities and his work is so diversified that he is unable to specialize along narrow lines. He has such a full programme of organization of his own that his time for reading along technical lines is limited."

With this in mind, it is suggested that it is a primary duty of the extension head to keep the men in the field well supplied with scientific but practical, and above all, timely articles. Much of this type of information is available through the press. Critical reviews of scientific research could be published in *Scientific Agriculture* from time to time, and extension methods and problems should come under discussion. The journal could list Canadian bulletins and circulars when these are published, together with brief statements of the nature of the material which they contain. All institutional workers could file with district representatives copies of correspondence carrying agricultural advice to farmers within their own areas, and every opportunity should be taken to make personal contact between extension men and technical workers.

An extension man is inclined to lose perspective and this should be counteracted by every possible means. Intimate contact between extension, teaching, and research workers should be encouraged that each may become familiar with the work of men in other lines of activity. This could be accomplished by:—

(a) Conferences at the Agricultural College at least annually.

(b) Extension men giving or attending lectures at the College of Agriculture.

(c) Attendance of all workers in conferences and meetings at Departments of Agriculture, Experimental farms, C.S.T.A. locals, etc.

One Province puts forth the suggestion that there be an agricultural news service for extension men, written up by a newspaper man with some agricultural training. This would require a central clearing-house and contacts with each of the Provinces, agricultural colleges, and other agricultural agencies of this nature, looking towards standardization of these reports.

5. Training of Extension Workers

Considerable comment was received on this point, and the consensus of opinion was that insufficient attention was paid to the training of extension workers, both undergraduate and graduate. In witness of this are three quotations from widely separated points:—

(1) "Our college graduates do not receive sufficient training for this work as they know little about office organization and routine such as filing, reports, etc. Colleges should provide training in these phases of extension work."

(2) "We recommend that specialized courses be offered at our agricultural colleges for extension workers, both as undergraduate and graduate options."

(3) "That consideration be given by college authorities to the question of including in the curriculum, lectures on all phases of extension work, particularly to the graduating class."

In this connection, too, it was felt that one college in Canada should make some attempt to specialize on types of instruction to meet the needs of extension men.

Thus a review of the field brings out the fact that the existing conditions under which extension work is carried on, are far from satisfactory in many Provinces and admit of a great deal of improvement.

In many cases, proper remedies tend to suggest themselves; in some, suitable changes can only be recommended after much careful study and analysis; and in others, any suggested changes must give rise to varied opinions as to their acceptability.

L. S. Klinck, Chairman.
C. E. Boulden
L. C. Roy
R. S. Duncan
N. C. Mackay
A. Aamodt
L. E. Kirk
E. E. Carncross
H. R. Hare
J. A. Clark
A. E. MacLaurin.

REPORT OF THE C.S.T.A. COMMITTEE ON RESEARCH

W. H. Brittain, *Chairman* *

1. Introduction

At the last annual meeting of the Society two important events touching on the work of the Committee on Research occurred. In the first place, there was no report from the committee. Secondly, the *Committee on Nominations* recommended the abolition of the *Committee on Research*. This recommendation failed to carry, but, in view of the uncertainty that appeared to exist as to what work such a committee could usefully undertake, the opinion was expressed that it was unfair to expect a committee to carry on without some definite mandate from the organization as to their duties, function and scope of work. It was therefore decided that the Committee be reconstituted and charged with determining the thought of the membership with respect to the following definite points:

1. Whether the Committee should be retained or abolished?
2. If advisable to retain it, how should it be constituted?
3. What definite tasks should the Committee, if reconstituted, undertake?

At the request of the Chairman of the Committee many locals have appointed subcommittees to consider the matter, and report. The reports have been presented to the various locals and, if endorsed, have been forwarded to the Committee. Many recommendations and suggestions have likewise been received from individual members. These recommendations and suggestions have been classified under suitable headings and are presented herewith in order to facilitate study and discussion. They do not necessarily represent the opinion of the Committee.

2. Retention of the Committee

No local recommended the abolition of the Committee. Even in cases where no concrete proposals were forthcoming as to what the duties of the Committee should be, beyond the general function of fostering agricultural research, the view was expressed that there must be some useful work for the Committee to do. Others go further and one report states that the Committee "represents the life blood of the society". While no local, therefore, has gone on record as opposed to the retention of the Committee, it should be noted that a number of individual members have expressed themselves as at least doubtful of its value. One man puts it, "We have appointed a Committee without giving them any duties to perform. Now we are trying to find something to justify their existence and this looks like a difficult task."

3. Constitution of the Committee

Several suggestions have been made by locals and individuals indicating that the present constitution of the Committee is unsatisfactory and the following proposals have been put forward:

1. That the Committee on Research be combined with the Committee on Graduate Studies.

2. That the different sections form committees on research and that each of these sections appoint a representative to serve on the central committee.

* Professor of Entomology, Macdonald College, McGill University, P.Q.

these members to elect their own chairman. The membership might be supplemented by members elected "at large" by the general convention.

3. One local recommended that the Committee be reconstituted to a Committee of one, whose duties would be to submit to the annual meeting of the Society, a report on the projects in agricultural research in Canada completed during the twelve months prior to the meeting, this report to be in the nature of a general review and not a summary of individual projects.

4. Personnel of Committee

From one local has come some pertinent remarks regarding the personnel of the Committee. The fact that it should be composed of men actively engaged in research is stressed.

To quote one communication: "Statisticians claim that the output of original research ceases with the publication of the doctorate theses in eight out of every ten persons. Possibly the majority feel that they have earned the privilege of settling back in arm chairs. It is the function of the research committee to look after the two that escape the arm chairs. Unfortunately, as far as constructive research is concerned, mental disintegration is positively correlated with the arm chair incubation period. The greatest danger is after complete break-down when our pseudo-scientist may seek membership upon the Committee of Research."

The feeling was also expressed that only men should be appointed to such committees who are willing to work on them. While it is not always possible to learn in advance whether a given individual is willing to serve, it should be possible to find out later, and if any member is elected who declines to serve, if he does not even reply to letters sent by the chairman, as is sometimes the case, the latter should be empowered to replace him with someone else. This will prevent the annual report from becoming merely a statement of the personal opinion of the chairman.

5. Work of Committee

Many recommendations have been received as to projects that should or could be attacked by the committee. A number of these deal with matters that come under the jurisdiction of other committees and are therefore excluded. Others, while setting forth very clearly various matters that come within the field of research, do not suggest any way in which the committee could usefully function in bringing about the desired end. Apart from the foregoing, a number of constructive suggestions have been received, and, while it is difficult to arrange these in any logical order, these suggestions have been arranged in order of their apparent greatest importance, as judged by the number of locals making that particular recommendation.

1. Revival of Scheme to Prepare a Survey of Agricultural Research Projects in Canada

Several locals placed first on the list the advisability of undertaking such a survey, pointing out that if the Committee can do anything as a society to stimulate research, it would be through focusing upon the research already done. One report discussed this matter in the following terms: "The Committee on Research will perform a useful task if they can develop a 'Who's Who

in Research', provided this be based on accomplishments and not merely on plans."

Several plans are forthcoming as to how this survey could be accomplished:

(a) Some consider that it could be done by the committee; others point out that this would merely result in a list of projects of no value as indicating actual accomplishment,—that, in fact, there would be a competition to list the largest possible number. The consensus of opinion seems to be that little good could be accomplished in this connection unless a thoroughly competent investigator took the matter in hand, with a view, not only of *listing* projects, but of *evaluating* work and workers.

(b) For the foregoing reasons several consider that the work should be carried out along the same lines as Dr. R. Newton's survey of graduate training in Canada.

(c) That the Research Committee approach the Federal Department of Agriculture with the hope of obtaining a grant to enable the appointment of someone to undertake this task or, in lieu of this, that the Department designate some one to undertake the work under the general direction of the Research Committee. Inasmuch as it is the wish of the Department of Agriculture that such work be increased, it is believed that such a request should receive sympathetic consideration. Other sources of support are also suggested.

2. *Training of Men, Scholarships, Etc.*

Several locals stressed, (1) the matter of the training of men for investigational purposes, (2) the need for further facilities for study and research, (3) the difficulties of junior officers in attempting to secure the necessary leave and plans for securing further consideration of this matter by the authorities concerned, (4) the necessity of securing more scholarships for graduate study and cognate problems. It seems clear that the cause of research can best be furthered by the provision of more scholarships, by the arrangement of facilities for travel and by an arrangement whereby there might be an interchange of workers between Departments of Agriculture and the Universities. It was pointed out that both should benefit by such an interchange. It appeared to this committee, however, that the foregoing is a problem for the Committee on Graduate Studies to consider.

Another suggestion along the same line was that consideration be given to some basis of interchange of research workers among the various units of the Empire.

3. *Responsibilities of Research Workers*

It appears to be the opinion of many that our organization is not making itself felt in the manner it should in formulating plans or research to solve the problems of agriculture. Research workers appear to be content to work in a restricted field, to the exclusion of larger aims. It was pointed out by one member that our biggest national problem at the present time is wheat and yet the organization representing all the technical workers in Canada is not heard in this matter and has no sub-committee studying the problem.

In the words of Sidney Webb (Lord Passfield) we are "an able, honest, but secretive bureaucracy". It was suggested that a much more positive stand

should be taken by the research worker with respect to such problems as those indicated.

4. Methods of Appointment of Research Workers

The alleged unsatisfactory manner in which research workers are appointed in Canada as contrasted with the system forwarded in Great Britain, was mentioned in one report. It is recognized that research in Canada is in its infancy and one of our chief problems is to discover and establish research workers. Often it is necessary to import workers from outside the country and there is no objection to importing the best man available in any given field, since, not only will he enrich that field by his personal efforts, but he will assist in the training of other workers. Sometimes, however, it is asserted, men are appointed to research positions which they are not qualified to fill. Since research workers are seldom dismissed for inefficiency, the vital importance of careful selection is obvious. The practice of wide publicity and a selection committee of *authorities* in the particular field, is especially recommended in this connection.

While this committee, perhaps unfortunately, cannot alter the system said to be in vogue in Canada, it is recognized that the matter is one of vital importance and possibly some good may be accomplished by drawing the matter to the attention of the authorities concerned with appointments. This Committee has made no investigation of the matter.

5. Standardization of Methods

What may the committee do towards the furtherance of such duties, aims or objectives?

Should such a committee attempt to standardize the general principles of procedure to be followed in any line of research? This has been answered in one report as follows: "All research workers would oppose an attempt to standardize the general principles of research procedure." They point out that the very essence of research is the formulation of new principles, rather than the standardization of old. Rather than attempt to standardize, those who held this view maintain that the Research Committee should attempt to *evaluate* research methods. They consider that the rank and file of research workers would be eager to obtain the views of a committee composed of eminent research workers. Standardization of nomenclature, statistical methods, etc., is, however, always worth while, provided the standardization is revised at sufficiently frequent intervals.

6. Organization of Research

The question was raised by a number of locals as to whether our present type of departmental organization was best calculated to give results in research.

It was suggested that the Committee give some thought to the present method of organization within Canadian agriculture for scientific work, particularly as to whether the program of work might not be more generally centered around, and more closely associated with, the particular research problem under consideration.

The idea behind this recommendation appears to be that our present organizations are too highly departmentalized and that an effort should be

made to attack research problems on a project basis, wherever the particular problem transcends the limits of a single Branch or Division.

At least a start has been made in this direction in a number of the universities and in the federal Department of Agriculture in attacking certain projects on this basis, but it is considered desirable that study be given to the problem of whether this type of approach cannot be usefully extended.

7. Securing of Information for Imperial Bureaux, Etc.

Since several locals make the suggestion that the Committee attempt to abstract papers published in technical journals in Canada, to secure lists of projects or to carry on other similar lines of work with the idea of passing much information on to the Imperial Bureaux, inquiry was made to determine whether this was work that the committee could usefully attempt. It was found that the authorities concerned were securing the desired information through "correspondents" in each field and expressed themselves as entirely satisfied with the present arrangement.

It was furthermore pointed out that, as far as abstracting literature is concerned, such journals as Biological Abstracts, Review of Applied Entomology and similar abstracting journals are covering this field to well that it would be futile for the Committee to embark on such a field, especially in view of the enormous labour involved.

8. Local Committees

Several locals stressed the importance of local sub-committees on research and expressed the thought that the central committee could not function properly without the coöperation of such sub-committees. It was suggested by one local that such sub-committees be representative of the various branches of agriculture, corresponding to the existing groups of the C.S.T.A. and that the local representative of each group keep in contact with the central representative, so that he would be well posted at all times on the activities of the various locals.

9. Coördination of Work, Etc.

Several locals considered that an important function of the committee was to stimulate coöperation and coördination, as well as to act as clearing house for information. Opinions differed as to how this should be brought about. One method has been discussed under the heading of "local committees". Other suggestions are as follows:

(a) That the Research Committee obtain from the locals or sections lists of the more vital problems requiring immediate investigation, these several lists to be classified into a complete list and made available to the heads of departments at universities and colleges with the hope that some students may be stimulated to tackle these selected problems.

(b) That, if feasible, the list of projects named by applicants for C.S.T.A. fellowships be passed on by the Research Committee some time before the committee meets to award the fellowships.

(c) That the committee endeavour to establish contact with research in related sciences, in which the workers are not members of our society.

(d) A further suggestion along this general line dealt with the more or less haphazard and sometimes irresponsible manner in which complicated problems were undertaken. It was pointed out that, in many districts covered by a single C.S.T.A. local, representatives of various organizations are engaged in agricultural research. The problems on which they are working originate, for the most part, in the minds of individual workers. Previous to the initiation of the problem there is often no full discussion by all interested parties. There is indicated, therefore, a grave weakness in the method of selecting problems, which frequently results in workers in various fields all claiming that a certain problem is peculiarly their own. The point is made that there should be a better method of selecting problems to be attacked, of deciding who should attempt them and, in general, the scope of the proposed work. It is suggested that the proposed local committees, in consultation with the organizations concerned and with the growers, whose welfare is supposed to be the "raison d'être" of all activities, should give the necessary leadership in this matter. It is considered that this question is one that might properly be studied by the committee.

(e) Owing to the important position of the Dominion Department of Agriculture, with its representatives in all provinces, it was recommended by one local that the Committee on Research endeavour to coöperate directly with this department.

It is suggested that the Research Committee advise the Honorable Minister of Agriculture for Canada of its desire and the desire of the Canadian Society of Technical Agriculturists in general to coöperate in every possible manner with the Federal Department of Agriculture for the furtherance of research and scientific work in this field.

General

That the Research Committee should attempt to elevate ideals of research in the organization by having occasional papers of an inspirational nature published in the magazine, and at least one paper along a similar line at the annual convention, is suggested in one report.

It is also suggested that it might be useful service to organize a discussion once a year (at the annual meeting) on some topic of interest or importance and give, as a result, a considered opinion in the light of the best information available. Topics should be selected a year ahead to give opportunity for preparatory thought and enquiry and perhaps for preliminary discussion in locals where this could be arranged.

It is said that, since a comparatively small portion of the membership of the society have the "credentials of the trade" so far as research is concerned, it is advisable to keep before all the highest ideals of scientific research and build up, as far as possible, an attitude of mind to our profession that will naturally result in the highest type of work.

Conclusion

In presenting the foregoing suggestions, the result of much sound thought on the part of a large proportion of our membership, the Committee has fulfilled the particular task with which it was charged by the 1930 Convention. It is for this Convention to decide which of the foregoing, if any, shall be

accepted. In doing so, it is the hope of the Committee that the fact be kept clearly in mind that there is a definite limit to the capacity of any committee operating without funds to carry out the many useful pieces of work that may suggest themselves to the members.

In conclusion, the Committee recommends that, after full discussion in open meeting, the members of the Committee on Research present at the annual meeting be empowered to draw up a resolution, embodying the thought of the delegates present as to the points raised in the foregoing report, to be presented to the delegates at a later session. It is their opinion that the importance of the subject justifies a full half day being made available for the discussion.

W. H. Brittain, Chairman.
C. H. Goulden.
W. R. Graham.
R. Newton.

REPORT OF THE C.S.T.A. COMMITTEE ON ECONOMICS AND MARKETING

J. L. Lattimer, *Chairman**

The report of your committee on Economics and Marketing presented one year since stressed the need for providing more thorough training for students preparing for this line of work. It was felt that some curiosity was aroused as to just what such men might accomplish were they available. Possibilities along this line were not broached in the report referred to. Some members of the committee suggested that this omission was one of the weaknesses of that report. It is hoped that what was omitted at that time will be now supplied. The personnel of the committee includes, in addition to those serving during the previous year, Dr. J. F. Booth, Commissioner of Agricultural Economics.

The omissions of the previous report and the similarity of the personnel of your committee together point to the necessity of filling in the gaps, if any, in the earlier report. Other reasons contributed towards the direction which this report should take. Indeed, current events during the past year appear to have conspired together to influence greatly the gist of this report by demonstrating the lack of, and need for, more detailed information of a business nature, particularly in regard to demand and supply of various farm products than we now have at our command. Events of the past year conspiring together to stress the need for this business information include the drop in prices of some farm products which has revealed the risky nature of following any farm activity on the basis of a pious hope rather than on as complete and reliable information as it is possible to secure, and secondly, the degree of reorganization of farming which has come about from necessity which has developed a demand for farm managers and supervisors in the attempt to deliver both farmers and financial institutions from their difficulties. The development of such conditions has created a demand for men of a type that are apparently not being provided by faculties of agriculture. The

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type of training offered elsewhere was briefly sketched in the preceding report. What apparently requires emphasis is the increasing dependence upon outside sources for securing men with the type of training and experience required and what work might be undertaken were the requisite personnel available.

Need for Trained Men

The exigencies which have developed during the past two years have confirmed the need—suspected in some quarters for some time—for reducing the cost of production of farm products in order to compete in world markets. Reducing production costs may entail some reorganization of the business. No business reorganizes unless under compulsion. The compulsion necessitating some reorganization is gradually taking place. In the process, financial institutions are acquiring ownership of considerable land. Not being experienced in farming and apparently not particularly anxious to secure that experience at first hand, these companies employ supervisors and managers in an endeavor to overcome their financial difficulties. The demand for farm managers and supervisors is being met from outside sources. Some countries are indeed so far ahead of this country in being able to meet this demand that they are able not only to supply men in this field, but also train our own men in a very large degree and even assist in our investigational work as for instance in the investigation which has been proceeding for some time now in relation to the pioneer belts. In the meantime, owing partly to the recent development of demand for workers in this field but also to lack of recognition of this need in the responsible quarters some of us are compelled to recommend men trained elsewhere than in faculties of agriculture to study and investigate the business problems of the farm. Perhaps this is as it should be. It would appear that so long as the supply is available, the source need not worry us greatly. Indications are that the enquiry into business conditions of the farming industry will be continued by others than faculties of agriculture. Those in faculties of agriculture who are interested in securing students or securing jobs for them might give this demand some consideration.

Market Analysis

Present exigencies bring great pressure to bear on marketing investigation. Some institutions in other countries have offered courses in price forecasting for some time. Market forecasts are periodically released to the public in the form of outlook reports. Activities in this line are not held in high favor at present for fairly obvious reasons. Yet it is essential to realize that market forecasting of some form or other is ever present. The pacification of producers of farm products in our own country has depended largely in the past on the frequent reiteration of the foundationless formula that "an unlimited market is available." Such simple and easy market forecasting is fortunately falling into desuetude. Another resort of some of our market forecasters has been to dangle the promise of the import food requirement of the United States before the vision of the growers of farm crops. After at least three decades of overwork this type of market forecasting is losing its appeal. A more recent type of market forecasting is the solemn and pretentious claim that there can be no such thing as a surplus of food while people are hungry. Apparently one of the most

certain roads to hunger is to grow some food products at present farm prices—unless the business is so organized that cost of production is very low—and unless this latter condition prevails the more one grows the hungrier he is likely to be. No criticism need be advanced toward these attempts at forecasting market requirements in general. These attempts are current and will continue until superceded by more accurate appraisal. Some appraisal of market requirements is essential to any plan of utilization of natural resources. The question is not whether this appraisal shall be done or not done but rather whether it shall be done well or ill. There appears at present an insistent demand that this job be better done.

Price Records

The necessary foundation for this work must be more accurate price records than are today available. More particularly it is essential that records of farm prices—admittedly the most difficult to secure—be made available. We have been recently told for instance that wheat prices are today the lowest for three centuries. Are they? If so, where? These are questions which suggest themselves. The farm price of wheat for the province of Ontario was estimated for the current year at 72c per bushel(1) while the average farm price for Ontario for the decade from 1891-1901 is given by the Ontario Bureau of Statistics as 67.8c(2) and we have a record of the sale of wheat in Ontario in 1920 at 37c per bushel.(3) Wheat prices are perhaps the most easily obtainable over long periods of any farm commodity price yet this misunderstanding is today possible. Records of prices of other farm products, some of which such as dairy products amount to more in the aggregate than wheat during the past two years, are perhaps even more essential to the intelligent direction of the expansion of the farming industry. These records are necessary in every line of farm activity. In this connection it is worthy of note that many of the States of the union are just recently publishing records of farm prices for the past half, and in some cases three-quarters, of a century. A recent study in Maryland records prices since 1851. Illinois dates back to 1866, while the state of Utah naturally begins at a later date, 1910. Available records of the prices and movements of some farm products in Canada are perhaps the best available anywhere yet these records have not been analysed and made as free use of as might be the case were capable men available who were not burdened with other work. Apparently from the work of your committee there is a great dearth of competent statisticians available in this country in comparison with the work required at the present time. One member of the committee suggested that it would require a score of statisticians to carry on the work requested while another member reported that men of the training required we might say are not available in Canada. Records of prices are only one factor in market analysis. Equally essential is the amount of business present and potential. This brings us to a consideration of consumptive demand.

Demand, Present and Potential

Recent changes in food consumption compel attention and consideration. In 1871 in so far as records are available we find that this country produced and consumed some thirteen million dollars worth of wheat in round numbers, while during the same year the amount of dairy products entering into

(1) Dom. Bur. of Statistics, Monthly Bulletin, Mar. 1931, p. 15.
(2) Ontario Dept. of Ag. Statistics Branch 1929, p. 52.
(3) Ermatinger, C.O., The Talbot Regime, p. 104.

commercial trade amounted to only fifteen million dollars.([4]) During the past year the utilization of wheat for flour, feed and seed has been estimated at 110 million bushels, a farm value of some 48 million dollars, while the value of dairy products in 1930 is estimated at 277 million dollars([5]) and the net exports during that year were negligible. In other words our dairy industry has expanded almost as rapidly in value as wheat growing, the difference being roughly that while we consume the most of our dairy products we try to export about three-quarters of the wheat grown.

These figures are only approximate and are only submitted to indicate the need for studying consumptive demand, present and potential, as a necessary problem in marketing. The insistent urge for investigation of the potential demand in foreign countries is brought to our attention in a recent issue of the Commercial Intelligence Journal by the assistant trade commissioner in China. After a discussion of the developing market for Canadian wheat which is not fully analysed because the writer points out that he is not an expert in this line, he makes the following significant statement—([6]).

> "Canada's grain firms should not let a year go by without sending a responsible executive to visit Shanghai at least and if possible Tsingtao and Tientsin also, in order to see conditions at first hand and maintain close touch with the principal importers there."

One of our agricultural colleges at the present time encourages those specializing in economics to take the examinations set for assistant trade commissioners. In the United States a new service has recently been organized under Asher Hobsen, formerly the representative at Rome, with the idea of placing men with agricultural and economic training in several countries as assistant trade commissioners. A recent appointment by the United States has been a representative in the Argentine.

The appeal for the assistance of experts in marketing to supplement the efforts of our trade commissioners is but one example of evidence of the trend towards the consideration of agriculture as one of our many industries of interest to all. The long hoped for better understanding between agriculture and other industries displays some encouraging signs of approach.

Some unanimity of opinion is being reached between representatives of agriculture and industry as to the need for greater emphasis on the study of economics and marketing in faculties of agriculture. Two items of evidence are submitted—First a resolution passed by the Canadian Council of Agriculture at its annual meeting, February 2nd and 3rd, 1931—

> "Whereas it is necessary for the general prosperity of the country that more be known
>
> (a) about the difference between and the significance of intensive and extensive farming,
>
> (b) about the place of agriculture in the economic structure,
>
> (c) about the correlation between agriculture and industry, and
>
> (d) about the place of farm labor in our economic system, and
>
> Whereas it is of utmost importance that these subjects be taught and studied

(4) Dominion Bur. of Statistics, Canada Year Book, 1930, Statistical Summary, pp. XXVI-XXVIII.
(5) Dominion Bur. of Statistics, Monthly Bulletin, Mar. 1931, p. 73.
(6) Commercial Intelligence Journal, June 6, 1931, p. 906.

Be it resolved that these subjects be included and stressed in the course of studies at agricultural colleges, collegiates, universities, etc., and that they be made a special object of study by the National Research Council, and report thereon be made available to the public."

From another source need for extension of this work is indicated by the subjects announced for the economic fellowship contest provided by the Royal Bank during the coming year which are—

1. The wheat situation at home and abroad.
2. Price stabilization.
3. The degree of diversification present and potential in farming in western Canada.
4. Social legislation.

This list reveals what line of work is considered most urgent at the present time in some financial circles.

Graduates trained in faculties of agriculture are today numerous in the commercial world. Evidence indicates that expansion may be expected in this direction. Representatives in the commercial field are contributing much toward the more harmonious relations referred to. Yet they emphasize the need for greater effort in explaining to those engaged in other lines of effort some of the peculiar problems of the farm. To get this explanation over to those who farmed more or less successfully three or four decades ago—and from that experience feel competent to satisfactorily solve the farmer's problems in a single sentence—appears to be especially difficult. In the training of students for this work greater attention to the business side of farming would appear advantageous and in the light of recent endeavors to circumvent the somewhat influential forces of supply and demand greater stress on the elementary principles of economics would appear warranted.

Investigation Essential

The necessity of thorough investigation of production and marketing problems precludes the possibility of attaining prompt results. Market analysis to be of any permanent value must be based upon thorough investigation of all the factors involved. Reasonable brevity prevents even the enumeration here of the many avenues of effort in this line which might be followed with advantage. What is attempted here is to insist upon the necessity of securing all the information possible in order that at some time in the not too distant future the information secured may establish a more dependable foundation than we now have upon which to base productive programmes. It is possible to get by without this information only under favourable conditions the permanency of which can scarcely be depended upon. The analysis of the present depression given in a recent publication entitled "Canada 1931" enumerates the causes as follows—(7).

1. The international race to increase production and capture markets.
2. The breaking down of price control schemes.
3. The acute credit stringency.

(7) Dominion Bureau of Statistics, Canada 1931, p. 10.

The accuracy of this summary will be generally conceded. It is now clear also that the time to investigate business conditions is not merely during a depression but all the time. Under present conditions or any which are conceivable for some time to come the investigation and utilization of all available material appears imperative.

SUMMARY

A superabundance of evidence is accumulating, indicating the necessity for fact finding in a variety of lines. Among the lines of investigation now pressing for analysis may be included—

1. More attention to the business organization and management of farming.
2. Records of farm prices covering a period of years.
3. Investigation of consumptive demand for farm products in the domestic and foreign fields.
4. A comparison of prices for a period of years of—
   (a) Various farm products.
   (b) Other goods.

These are only a few of the subjects pertaining to farm organization, management and marketing upon which much more information than is now at hand might and should be made available before we may intelligently utilize our natural resources. These are some of the tasks which might and should be undertaken if and when we have suitably trained men available. In an era when unemployment is not unheard of these tasks appear to your committee *urgent*.

J. E. Lattimer, *Chairman.*
F. M. Clement
H. S. Fry
J. A. Carroll
J. F. Booth
H. C. Bois
H. S. Arkell

REPORT OF THE C.S.T.A. COMMITTEE ON PUBLICATIONS

L. E. KIRK *

Two matters received the attention of the Committee on Publications, namely the question as to whether it is advisable to limit the number of cuts that may be submitted with each article for publication in *Scientific Agriculture* and the question of how to make the journal more interesting and useful to members who are not engaged in research work.

With respect to the first of these it is obvious that the number of cuts which are necessary to properly illustrate an article will vary, some requiring several and others none at all. The Committee feels that this is a matter that can be judged best by the Editor (with the advice of the Editorial board) and that it should be left entirely to his judgement. If cuts are submitted which

*Professor of Field Husbandry, University of Saskatchewan, Saskatoon, Sask.

do not appear to be necessary, or too many of them in view of the cost of publication, the Editor should advise the author to this effect, who may then reduce the number or himself supply the necessary funds in excess of a certain number.

With reference to making the journal acceptable to a larger number of readers, the Committee begs to recommend that two to four pages of each issue be devoted to (1) listing Canadian bulletins as they appear together with a short paragraph giving the nature of what they contain; (2) the publication of short abstracts of new books and articles that have been found of special interest to members who have read them, and (3) notes of scientific interest to the general readers based on observation and research, especially those which have a practical application.

It will be necessary to circularize the members with a view to securing the type of contributions mentioned.

L. E. Kirk, *Chairman*.
H. E. Lefèvre
E. K. Hampson
C. H. Goulden
J. F. Booth.

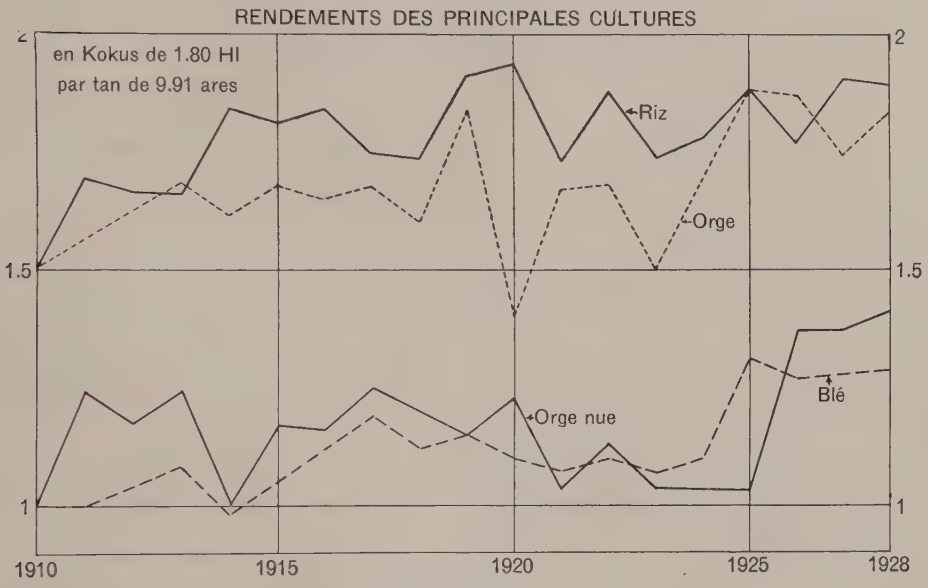
Massey Hall and Library, Ontario Agricultural College, Guelph.

L'AGRICULTURE AU JAPON

P. Rouquerol
Ingénieur Agronome, Tokyo, Japon.

II. Les Engrais Chimiques

Nous venons de voir précédemment que l'augmentation de production des principales cultures était due non seulement à l'accroissement annuel de leurs superficies, mais encore à une amélioration notable des rendements.



GRAPHIQUE IV.

Cette amélioration a, d'abord, son origine dans le développement des moyens de transport qui a permis de mieux approprier les diverses cultures aux différentes formations géologiques; elle est due également à l'amélioration des procédés culturaux, entièrement empruntée à la science occidentale: sélection des semences, prévention des maladies parasitaires, etc. . . et surtout application des engrais chimiques.

L'utilisation des engrais chimiques a commencé au Japon vers le début de la guerre sino-japonaise; les engrais organiques naturels avaient été seuls utilisés jusqu'alors; parmi ceux-ci, les tourteaux de soja importés de Chine, entraient pour une très large part dans la consommation japonaise. Les hostilités supprimant radicalement ces importations, le Japon s'est alors touvé dans la nécessité de se pourvoir d'autre manière en éléments fertilisants.

Une modeste société, "la Compagnie des engrais artificiels de Tokio" établie en 1888, au capital de 125,000 yen, et qui n'avait subi que des pertes successives au cours des cinq premières années de sa fondation, connut tout à coup une grande prospérité jusqu'en 1898, époque à laquelle plusieurs sociétés concurrentes commencèrent à déverser, elles aussi, leurs produits sur le marché (superphosphate).

La fabrication des engrais phosphatés se développa alors très rapidement, suivie de celle des engrais azotés; les engrais potassiques, malgré leur apparition tardive sur le marché japonais, ne le cédèrent en rien aux deux autres catégories d'engrais, quant à la rapidité avec laquelle ils furent adoptés dans la pratique agricole.

Engrais Phosphatés

Malgré des débuts difficiles, l'extension rapide de leur consommation devait être assurée, étant donnée l'extrême pauvreté du sol japonais en éléments phosphatés; aussi, la demande s'accrut-elle rapidement, en même temps que la production qui devint bientôt excessive.

La concurrence fut vive entre les diverses sociétés qui, pratiquant la vente à vil prix, connurent en 1901 une période fort critique: la grande prospérité industrielle qui succéda à la guerre russo-japonaise vint fort à propos remédier à cette mauvaise situation et permettre aux sociétés existant alors de se maintenir quelque temps encore: mais cette activité fut de courte durée et plusieurs durent sombrer dans une nouvelle crise.

C'est alors que fut constituée la DAI NIPPON JINZO HIRYO KABUSHIKI KAISHA qui réunit en une seule société "la Compagnie des Engrais Artificiels de Tokio" et plusieurs sociétés établies aux environs de cette ville. Cette société devint très puissante: sa production annuelle de superphosphate atteignit pendant de nombreuses années 60% environ de la production nationale; elle fabriquait, en outre, d'autres catégories d'engrais, ainsi que des engrais composés.

Cependant, la constitution de la "Dai Nippon Jinzo" qui diminuait le nombre des fabricants de superphosphate ne suffit pas pour éviter un nouvel avilissement des prix; en 1908, la situation devenait aussi dangereuse qu'en 1901.

L'année suivante, en 1909, L'ASSOCIATION DES FABRICANTS DE SUPERPHOSPHATE fut alors organisée en vue d'établir un contrôle de la production et des prix; la demande de ce produit s'accroissant régulièrement, de nouvelles sociétés apparurent pendant la guerre de 1914-1918. Le nombre total des fabricants de superphosphate s'éleva ainsi à treize, appartenant tous à l'Association.

Mais bientôt, une surproduction eut lieu en dépit des efforts de l'Association: la capacité de production annuelle de l'ensemble de toutes les sociétés atteignit 445,000 tonnes alors qu'elle s'élevait à peine à 95,000 tonnes en 1913. En 1922, cette capacité de production avait encore augmenté jusqu'au chiffre de 1,400,000 tonnes.

En 1923, la production subit une légère régression, plusieurs usines ayant été détruites par le tremblement de terre qui sévit sur la région de Tokio et Yokohama.

Il ressort de ces chiffres que l'accroissement de production a été de 77% au cours de la decade 1914-1924; l'augmentation de la demande fut, par contre, assez lente à se manifester: 20% seulement au cours de la même période. La consommation moyenne annuelle ne fut, en effet, que de 550,000 tonnes, durant la période 1922-1924, alors qu'elle avait été de 460,000 tonnes, au cours des années 1912 à 1914.

Nous verrons, par la suite, que par un singulier contraste la demande en sulfate d'ammoniaque et en tourteaux de soja fut beaucoup plus considérable, ayant plus que doublé; la consommation des engrais potassiques, encore à son début, est passée de 2,000 tonnes en 1914 à 12,800 tonnes en 1924.

Ainsi donc, les circonstances ne permirent jamais aux usines de superphosphate d'utiliser intégralement leur capacité de production;

en 1914	elles	n'utilisèrent	que	73%	de leur	capacité totale
1919	"	"		75%	"	" "
1924	"	"		37%	"	" "
1925	"	"		60%	"	" "

En 1925, alors que la demande semblait s'accroître avec une plus grande intensité que précédemment et que le moment semblait venu, pour les fabricants de superphosphate, de récupérer par des ventes massives une partie des pertes qu'ils avaient dû subir au cours des années précédentes, une extension de la fabrication commença; malheureusement la demande se ralentit aussitôt et les effets d'une surproduction ne tardèrent pas à se faire sentir sur le marché.

La concurrence fut de nouveau très vive entre les diverses sociétés; aucune d'elles ne put réaliser le moindre profit au cours de l'année 1926. Le rôle de l'Association des fabricants de superphosphate avait été, on le voit, purement illusoire et n'avait apporté aucun remède effectif.

Devant le danger de la situation, l'Association décida de procéder à une application plus rigoureuse de ses statuts; les résultats furent plus satisfaisants: sur une demande totale de 724,000 tonnes en 1926, 700,000 tonnes seulement furent produites, le surplus de 24,000 tonnes ayant été puisé dans les stocks constitués au cours de l'année précédente.

Le progrès financiers de cette industrie s'accusèrent encore au cours du premier semestre de 1927, plusieurs compagnies réussissant à réaliser quelques bénéfices. La "Dai Nippon Artificial Fertilizer Co.", en particulier, réussit à doubler le chiffre de ses ventes par rapport à la même période de l'année précédente.

En Août 1927, un accroissement du stock de 74,000 tonnes représentant une avance supplémentaire de 3 mois de consommation engagea les fabricants à la prudence: ils prirent les mesures nécessaires afin que la diminution de la production n'excédât pas 31%. En fait, cette diminution ne fut que de 20%.

Depuis cette époque, l'Association des Fabricants de Superphosphate fit de grands efforts en vue de maintenir un juste équilibre entre les quantités produites et les besoins de la consommation.

Malheureusement, une fois encore, les faits déjouèrent les prévisions et des stocks importants s'accumulèrent, de nouveau, en 1928; les prix subirent une forte baisse. Cette périlleuse situation ne fit que s'aggraver jusqu'à présent; plusieurs sociétés durent subir un rajustement financier et investir de nouveaux capitaux. La baisse soudaine des prix de la soie et du riz ne pouvait manquer de porter une atteinte immédiate à l'industrie du superphosphate déjà si éprouvée par tant de vicissitudes; le maintien à 20% de la réduction de la capacité de production se montra bientôt insuffisant pour enrayer l'accumulation des stocks; et cette réduction dut être portée à 37.5%

selon les termes d'un accord conclu en Août 1929, à valoir pour une période de 4 mois de Septembre 1929 à Janvier 1930.

En outre, l'Association décida d'encourager par tous les moyens l'exportation des stocks existant; il fut décidé, à cet effet, qu'une somme de 60,000 Yen serait consacrée annuellement à encourager les exportateurs éventuels. Cette somme représente, en l'état actuel du stock, une bonification de 10 sen par kwan de 3.75 kgs. (prix actuel du super 18% : Y 1.05 les 10 kwan—37 kg. 500).

Les marchés chinois, ainsi que ceux des îles des Mers du Sud, sont devenus, de ce fait, l'objet d'une attention toute particulière, de la part des fabricants de superphosphate japonais.

Les quantités de superphosphate et d'engrais composés produites par les différentes sociétés, au cours de ces dernières années, sont indiquées par le tableau suivant:

Superphosphate et engrais composés
(en "Kwan" de 3.75 Kg.)

1927

Sociétés	Superphosphate		Engrais composés	
	Production	Ventes	Production	Ventes
Nihon Ryuso	1.868.381	1.485.596	441.441	421.769
Nitto Ryuhi	9.224.236	8.695.658	472.330	472.590
Niigata Ryusan	5.186.813	3.983.400	457.160	418.185
Hokuriku Jinzo	4.092.974	3.640.020	378.220	372.720
Osaka Alkali	8.074.838	6.102.391	679.979	619.246,8
Taki Seihi	—	22.325.494	—	11.722.285
Dai Nippon Jinzo	77.666.681	74.923.538	31.839.377	34.825.086
Taiwan Hiryo	3.999.110	2.725.538	6.980.188	7.066.867
Rasa-to Rinsan	24.370.192,5	25.215.297	629.050	476.595
Konoshima Jinzo	10.795.757	9.951.563	880.204	882.220
Teikoku Jinzo	10.167.093	9.133.079	1.029.680	1.026.010
Sumitomo Hiryo	26.509.298	21.017.174	5.037.546.69	4.944.575
Total	181.955.373,5	189.198.748	48.825.175.69	63.248.148,8

1928

Sociétés	Superphosphate		Engrais composés	
	Production	Ventes	Production	Ventes
Nihon Ryuso	1.084.315	1.520.470	799.525	715.710
Nitto Ryuhi	8.050.958	8.207.161	550.170	548.310
Niigata Ryusan	5.146.471	4.467.320	597.410	592.800
Hokuriku Jinzo	8.680.435	5.913.622	452.559	441.442
Toyo Jinzo	6.689.428	6.684.165	424.437	424.437
Osaka Guano	6.293.026	6.889.780	1.815.498	1.799.890
Osaka Alkali	13.254.585	11.770.821	954.673	1.009.662
Taki	—	21.965.084	—	16.746.907
Taiwan Hiryo	1.928.244	2.519.648	5.843.894	6.513.178
Dai Nippon Jinzo	81.158.212	86.150.644	39.900.395	43.637.147
Rasa-to Rinsan	25.432.814	25.926.656	375.651	380.540
Konoshima Jinzo	13.742.232	12.948.375	1.726.722	1.776.720
Teikoku Jinzo	9.885.240	9.912.562	964.460	964.460
Sumitomo	28.335.494	27.238.032	6.138.833	6.094.722
Total	209.681.454	232.114.340	60.544.227	81.645.925

1929

Sociétés	Superphosphate		Engrais composés	
	Production	Ventes	Production	Ventes
Nihon Ryuso	1.997.348	1.165.947	1.307.753	1.111.178
Nitto Ryuhi	9.133.951	8.988.009	1.026.595	1.025.405
Niigata Ryusan	4.298.545	5.507.945	978.126	972.765
Toyo Jinzo	4.549.773	4.279.100	871.370	871.370
Osaka Guano	5.734.163	5.993.859	2.089.470	2.097.780
Osaka Alkali	12.843.089	12.865.861	1.380.101	1.386.583
Taki	—	24.109.786,5	—	18.390.383,5
Taiwan Hiryo	3.554.250	2.647.521	7.465.099	7.462.222
Dai Nippon Jinzo	95.378.187	90.889.984	50.560.950	53.009.001
Rasa-to Rinsan	23.791.925	23.859.057	1.126.078	928.832
Konoshima Jinzo	11.586.041	12.432.215	1.762.656	1.750.420
Teikoku Jinzo	7.325.168	8.487.030	1.447.481	1.378.394
Sumitomo	29.683.517	28.545.569	6.754.589	6.691.225
Total	209.875.957	229.771.883,5	76.770.268	97.075.558,5

1930 (1er Semestre)

ociétés	Superphosphate		Engrais composés	
	Production	Ventes	Production	Ventes
Nihon Ryuso	2.761.704	3.198.555	1.332.513	809.079
Nitto Ryuhi	5.445.733	6.737.596	489.843	489.733
Niigata Ryusan	3.074.400	3.548.927	492.459	488.250
Toyo Jinzo	2.239.570	2.301.960	505.460	505.460
Osaka Guano	3.244.502	3.525.220	828.099	826.040
Osaka Alkali	5.820.268	7.335.616	656.360	624.414
Taki	—	15.792.083,5	—	9.978.065,5
Taiwan Hiryo	848.528	951.385	2.273.584	2.204.144
Dai Nippon Jinzo	52.024.611	71.684.862	24.567.645	26.968.137
Rasa-to Rinsan	12.119.136	13.302.667	191.863	218.905
Konoshima Jinzo	5.847.816	6.362.769	916.130	926.330
Teikoku Jinzo	3.799.984	4.794.630	855.247	930.170
Sumitomo	15.969.411	20.126.340	3.874.345	3.855.310
Toral	113.195 663	159.662.610,5	36.983.548	48.824.037,5

L'industrie japonaise fabrique l'acide sulfurique qui lui est nécessaire pour la production du superphosphate, à l'aide de pyrites extraites de son sol; mais elle importe du Maroc, de l'Algérie, de la Hongrie, de l'Amérique, des Iles Christmas et des Iles Sandwich, des phosphates naturels dont la teneur en acide phosphorique varie de 15 à 30%.

Les quantités d'acide sulfurique fabriquées au cours des dernières années ont été les suivantes:

1923	285,000	tonnes
1924	463,000	"
1925	521,000	"
1926	475,000	"
1927	600,000	"
1928	668,000	"

tandis que les importations de phosphates naturels se sont élevées en

1922	à	282,800 tonnes
1923	—	154,430 "
1924	—	263,000 "
1925	—	256,100 "
1926	—	403,500 "
1927	—	404,000 "
1928	—	469,500 "
1929	—	554,600 "

Il est à remarquer que 50% seulement de l'acide sulfurique produit est utilisé dans la fabrication du superphosphate; 24% sont réservés à la fabrication du sulfate d'ammoniaque et le reste à l'industrie chimique. (en 1929).

Les engrais azotés

Les engrais azotés, dont l'effet apparent sur les plants en cours de végétation est le plus considérable, acquirent, des le début, la faveur des cultivateurs japonais et furent importés, chaque année, en quantités de plus en plus importantes; parmi ceuxci, le sulfate d'ammoniaque se plaça de suite en premiere ligne.

La première usine d'engrais azotés fut construite en 1908 à Sogi, dans l'Ile de Kiushu; elle était destinée à fabriquer de la cyanamide calcique selon le procédé Frank Caro. La production commença en 1909; ses débuts furent modestes.

Après avoir subi quelques perfectionnements dans ses procédés de fabrication, l'usine de Sogi devenait en 1911 la propriété d'une nouvelle compagnie: NIHON CHISSO KABUSHIKI KAISHA, placée sous le contrôle de la Cie Mitsubishi. La Nihon Chisso K. K. est devenue aujourd'hui la plus grande fabrique de sulfate d'ammoniaque au Japon; sa production en 1929 a été de 110,000 tonnes, soit 44% de la production totale indigène; indépendamment de l'usine de Sogi, cette société possède deux autres usines à Mizumata et Nobeoka (Kiushu) qui utilisent le procédé Casale. Enfin, deux nouvelles usines viennent d'être installées tout récemment en Corée ayant des capacités respectives de 100,000 et 200,000 tonnes.

Au fur et à mesure que la demande en sulfate d'ammoniaque s'accentuait, de nombreuses fabriques ont été construites parmi lesquelles nous ne citerons que les plus importantes.

La Denki Kagaku Kogyo K.K. contrôlée par la Société Mitsui, possède la plus grande capacité de production après la "Nihon Chisso K.K." Ses trois usines situées dans les préfectures de Toyama, Niigata et Fukuoka ont produit 60,000 tonnes en 1929.

La Compagnie Miniere Mitsui possède deux usines, l'une à Hikoshima, l'autre à Omuda (Kiushu), utilisant toutes deux le procédé Claude. La licence de ce procédé appartenait au paravant à la Société Suzuki qui, lors de sa faillite, a dû céder ses droits à la Banque de Formose qui, à son tour, les a vendus à la Compagnie Minière Mitsui. La production de cette Compagnie a été de 7,000 tonnes en 1929.

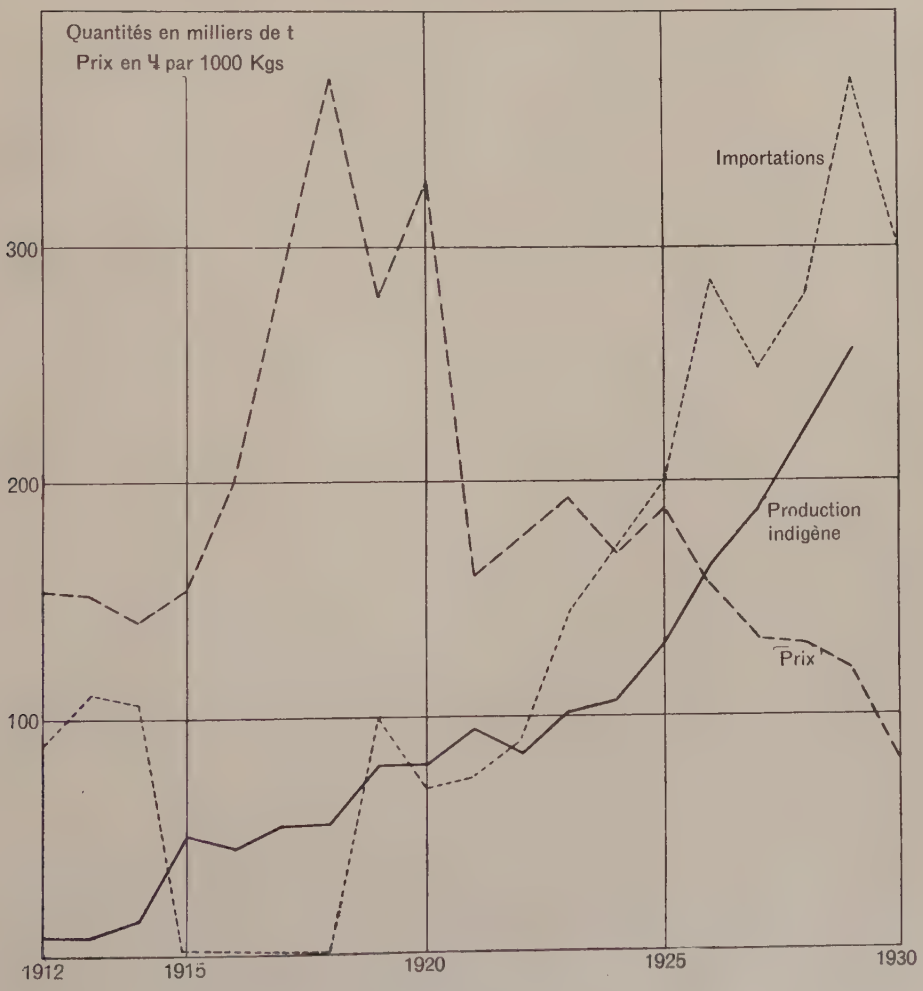
La Dai Nihon Jinzo Hiryo K.K. qui est la plus importante de toutes les sociétés d'engrais chimique du Japon a produit dans son usine de Toyama 30,000 tonnes de sulfate d'ammoniaque en 1929.

La Compagnie des Chemins de Fer *du* Sud de la Manchourie a produit 10,000 tonnes au cours de cette même année.

Enfin, les quantités suivantes ont été produites par des sociétés de moindre importance :

Government Steel Works	11,000 tonnes
Toyo Iron Manufacturing	3,000 "
Daido Fertilizer Co.	44,000 "
Hokuetsu Electr. Power	2,400 "
Japan Steel Manufacturing	2,000 "
Mitsubishi Steel Works	1,100 "
Kamaishi Steel Works	1,100 "
Autres producteurs	8,000 "

L'ensemble de la production japonaise totalise ainsi en 1929 250,400 tonnes.



GRAPHIQUE V.

Malgré tous les efforts du Gouvernement pour augmenter la capacité de production des usines existantes et pour multiplier leur nombre, les quantités fabriquées au Japon ont toujours été insuffisantes pour satisfaire les besoins de la consommation et le complément a dû être importé chaque année en quantités de plus en plus grandes jusqu'en 1929.

Le graphique ci-contre indique les quantités de sulfate d'ammoniaque importées, ainsi que les quantités produites au Japon depuis 1912.

L'on voit que la période 1914-1918 pendant laquelle les importations cessèrent presque complètement, fut particulièrement heureuse pour les fabricants de sulfate d'ammoniaque: le prix de la tonne qui n'était que de Yen 120 en 1914 s'élevait subitement à Yen 380 en 1918, ce qui permettait à la "Japan Fertilizer Co." de distribuer à ses actionnaires des dividendes variant entre 100% et 150%, tout en augmentant considérablement son fonds de réserve; c'est, d'ailleurs, grâce à ces réserves que cette compagnie put résister par ses propres moyens à la crise économique qui succéda à l'arrêt des hostilités.

La suppression forcée des importations, d'une part, puis l'augmentation très rapide de la demande, d'autre part, semblaient réserver un avenir magnifique à cette industrie; il est à remarquer que cette demande comportait non seulement les besoins de l'agriculture, mais encore les besoins des nations belligérantes pour qui certains composés de l'azote était un facteur essentiel de leur armement; ainsi donc, le Japon qui avait été jusqu'en 1914 un client de l'Europe devint tout à coup son fournisseur. Aussi, est-ce surtout à partir de cette époque que se constituèrent la plupart des sociétés productrices de sulfate d'ammoniaque.

L'arrêt des hostilités ne pouvait manquer d'apporter de profondes modifications dans l'état d'une industrie qu'aucune concurrence n'était encore venue contrarier; non seulement la demande cessa de la part de l'étranger, mais les importations réapparurent. La baisse des prix fut aussi rapide que l'avait été leur ascension: dès le début de 1919, le sulfate d'ammoniaque ne valait plus que Yen 275. En 1920, il remontait jusqu'à 330, les importations ayant légèrement diminué sur l'année précédente; l'année 1921 marqua la fin de cette ère de prospérité quasi-fabuleuse de l'industrie du sulfate d'ammoniaque; le prix descendit jusqu'à Y 180.

Cependant, les importations de l'Angleterre, de l'Allemagne, de l'Amérique et de la Chine augmentaient considérablement, d'année en année, venant compléter sur le marché japonais l'insuffisance de la production indigène; les prix subirent encore quelques fluctuations jusqu'en 1925, puis baissèrent continuellement jusqu'à présent. En décembre 1930, le produit valait Y 69.

Le tableau ci-contre indique les quantités importées ainsi que leur provenance (depuis 1922).

La crise économique mondiale actuelle ne fait qu'aggraver une situation déjà fort critique, par ailleurs, pour les fabricants de sulfate d'ammoniaque; la plupart des producteurs, sinon tous, ne peuvent soutenir la concurrence que leur opposent les producteurs étrangers. De nouvelles usines en cours de construction depuis plusieurs années ont dû suspendre leurs travaux avant même d'avoir pu se livrer à aucune fabrication.

Consommation du sulfate d'ammoniaque
(en tonnes)

Années	Importations	Production Indigène	Consommation Totale
1912	85.000	7.000	92.000
1913	112.000	7.000	119.000
1914	106.000	15.000	121.000
1915	2.110	49.590	51.700
1916	715	43.785	44.500
1917	1.520	54.480	56.000
1918	109	53.891	54.000
1919	101.000	79.000	180.000
1920	70.943	79.100	150.042
1921	77.958	93.582	171.540
1922	91.535	83.245	174.750
1923	144.574	102.925	247.500
1924	167.061	107.358	274.419
1925	201.928	129.521	331.449
1926	287.052	166.393	453.445
1927	247.574	187.172	434.746
1928	282.227	222.584	504.811
1929	377.638	250.400	628.038
1930	300.602	(x)	(x)

(x) Ces derniers chiffres n'ont pas encore été publiés.

Importations de sulfate d'ammoniaque
(en tonnes)

Années	Allemagne	Angleterre	Etats-Unis	Kouang-toung	Autres Pays
1922	—	2.150	82.034	981	5.270
1923	1.063	45.257	85.767	1.771	10.715
1924	51.784	55.843	30.441	1.981	27.012
1925	97.073	24.780	47.589	1.776	30.710
1926	167.590	38.574	67.353	947	13.588
1927	134.977	60.104	40.412	2.199	9.882
1928	100.341	48.275	19.718	1.172	23.510
1929	182.000	139.000	54.000	2.800	2.200
1930 (dix premiers mois)	177.824	84.996	40.979	1.946	2.413

Le gouvernement n'a eu d'autre ressource, en de telles circonstances, que de subventionner immédiatement ses producteurs défaillants; il s'agissait moins, en effet, de secourir des producteurs d'engrais chimiques que de maintenir dans le pays une industrie dont la dernière guerre a montré toute l'importance en cas de conflit. L'aide financière directe ainsi apportée par le Gouvernement à une industrie parasitaire et dont les frais sont supportés par toute l'industrie en général, a été vivement critiquée tant par les fermiers que par les industriels.

L'établissement d'un droit d'entrée à l'égard du sulfate d'ammoniaque étranger a été mis à l'étude depuis plusieurs années déjà, mais l'opposition a été tellement vive, de la part des associations agricoles, qu'aucune suite ne fut donnée à ce projet qui risquait, en outre, de susciter une réciprocité de la part des pays étrangers sur les produits japonais exportés.

La crise aiguë qui sévit actuellement a incité le Gouvernement à tenter l'application d'une proposition qui fut émise il y a quelques années, alors que

les produits azotés d'origine synthétique ne jouaient pas encore un rôle aussi important qu'aujourd'hui.

Le but du plan est de régulariser le commerce des engrais azotés minéraux et, par suite, de stabiliser leurs prix; il prévoit, à cet effet, que l'achat, la vente, le stockage et toutes opérations commerciales concernant cette catégorie d'engrais, seront soumis au contrôle de l'Etat; cependant, si les circonstances le permettent, l'Etat ne se réservera la gestion que de la moitié des ventes effectuées de Mars à Octobre, c'est-à-dire pendant la période de grande consommation; cette mesure est destinée à diminuer le plus possible le préjudice causé au commerce local. L'Etat vendra directement aux associations agricoles et aux négociants; en outre, les opérations effectuées par l'Etat au cours des années futures sont ainsi prévues:

Années	Achats (en milliers de tonnes)	Ventes (en milliers de tonnes)
1930	115	108
1931	129	126
1932	183	174
1933	173	172
1934	211	207
1935	196	194
1936	245	242
1937	223	222
1938	270	267

Selon les termes du projet, son application doit être confiée à un Comité de vingt membres comprenant des représentants du Gouvernement, des associations agricoles et des personnages particulièrement compétents en matière de commerce agricole.

L'opposition à ce projet fut aussi vive de la part des associations agricoles et des négociants, qu'elle l'avait été lorsque l'Etat s'était proposé de frapper d'un droit d'entrée le sulfate d'ammoniaque d'importation; une telle entreprise était de nature à léser un trop grand nombre d'intérêts particuliers pour qu'elle pût être mise à exécution; en outre, cette solution n'évitait en aucune façon le reproche adressé auparavant par les industriels au Parlement: cette "stabilisation" du prix qui signifiait avant tout "hausse", ne pouvait se produire que grâce à une subvention spéciale du Gouvernement en faveur des producteurs indigènes ou par le moyen d'une entente avec les producteurs étrangers: dans le premier cas, c'est l'industrie nationale toute entière qui contribuait à cette subvention; dans le deuxième cas, elle se trouvait entièrement supportée par les fermiers au bénéfice de tous les producteurs, indigènes et étrangers.

Quoi qu'il en soit, il est un fait qui obligera le Gouvernement à adopter vraisemblablement l'une ou l'autre de ces mesures malgré toutes les protestations dont elles sont l'objet: le prix de revient moyen du sulfate d'ammoniaque indigène reste très supérieur à celui du sulfate d'importation C.I.F. L'existence des usines japonaises ne pourra donc être assurée que par des sacrifices dont seule la forme—et, par suite, la catégorie de contribuables—restent à déterminer.

Actuellement, la forme qui parait recueillir le plus de suffrages, est celle d'une entente avec les producteurs étrangers; des négociations sont en cours en vue d'augmenter le prix jusqu'à Yen 85.

L'emploi du *Nitrate de Soude* au Japon a toujours été beaucoup plus modéré que celui du sulfate d'ammoniaque; les importations se sont maintenues à un niveau à peu près constant de 1922 à 1929; en 1929, toutefois, une augmentation sensible s'est produite en raison de la faiblesse des disponibilités en sulfate d'ammoniaque sur le marché. Les quantités importées ont été les suivantes:

1922	52,447 tonnes	1926	63,474 tonnes
1923	62,553 "	1927	55,000 "
1924	40,110 "	1928	52,225 "
1925	37,709 "	1929	87,866 "

En 1930, les importations de nitrate ont subi une diminution très sensible; celles-ci sont tombées à 30,330 tonnes, soit une diminution voisine de 33%, par rapport à l'année 1929.

La presque totalité du nitrate de soude est importée du Chili (85,500 tonnes en 1929).

Engrais Potassiques

Les engrais potassiques ont été utilisés au Japon depuis des temps immémoriaux, sous la forme de cendres végétales; leur richesse en potasse pure (K_2O) varie de 5 à 12%.

L'abondance des forêts, considérée par rapport à la faible étendue cultivée, a longtemps suffi aux exigences en potasse de l'agriculture japonaise; en outre, les engrais naturels utilisés de tout temps, en très grande quantité, ont également apporté au sol un certain appoint de cet élément fertilisant,—appoint faible, il est vrai, mais non négligeable.

Enfin, les eaux résiduelles des marais salants, ainsi que la calcination de certaines plantes marines, fournissent encore aujourd'hui de petites quantités de sels de potasse.

Les progrès de la civilisation s'accentuant et les bois acquérant une valeur plus grande, les forêts furent soumises peu à peu une gestion plus sévère, autant de la part de l'Etat que de la part des particuliers; puis, l'industrie naissante abandonnant progressivement l'usage du bois comme combustible commença d'utiliser le charbon moins coûteux. Les sources de potasse devinrent ainsi de plus en plus rares.

D'autre part, l'augmentation des rendements des principales plantes cultivées exigeant des quantités d'engrais potassiques de plus en plus considérable, le fermier japonais se vit dans l'obligation de compléter l'insuffisance de ses fumures archaïques par des engrais riches en potasse. C'est alors que furent importés d'Allemagne, en 1912, les premiers sacs de sulfate de potasse (48% de potasse pure).

L'emploi des engrais potassiques minéraux de généralisa très rapidement sur les cultures les plus diverses et les quantités importées s'accrurent, chaque année, ainsi que le montre le tableau donné plus loin.

L'on voit que les importations de sulfate de potasse furent suivies, quelques années, plus tard, par des importations de Chlorure de potassium. Celles-ci augmentèrent rapidement en raison du prix plus avantageux du chlorure par rapport au sulfate, sous un moindre volume; les qualités de chlorure d'importation les plus utilisées au Japon renferment en effet 52, 55, 60% de potasse pure.

Ces engrais potassiques sont employés, soit sous leur forme naturelle, soit le plus souvent sous la forme de mélanges avec d'autres engrais phosphatés ou azotés.

Les principaux pays importateurs de sels de potasse sont l'Allemagne, la France et l'Amérique; les quantités fournies par ces différents pays ainsi que celles fournies par les fournisseurs de moindre importance sont indiquées par le tableau suivant:

Importations d'engrais potassiques
(en tonnes métriques)

Années	Sulfate	Chlorure	Total
1913	1.850	—	1.850
1914	2.500	—	2.500
1915	—	—	—
1916	—	—	—
1917	—	—	—
1918	—	—	—
1919	74	—	74
1920	1.550	—	1.550
1921	1.150	—	1.150
1922	7.370	—	7.370
1923	4.815	—	4.815
1924	12.740	—	12.740
1925	21.600	2.050	23.650
1926	26.460	5.600	32.600
1927	31.000	12.980	43.980
1928	35.100	21.925	57.025
1929	53.770	27.370	81.140
1930	67.280	23.400	92.220

L'importation des sels de potasse français et allemands est assurée depuis 1928 par une société japonaise la Dai Nippon Kali Kabushiki Kaisha, dont le siège est à Tokyô.

Tandis que le marché des engrais azotés et phosphatés a dû subir de nombreuses vicissitudes, celui des engrais potassiques s'est toujours caractérisé par une grande stabilité. Cette stabilité est due, en particulier, au maintien d'un juste équilibre entre les quantités importées et les besoins de la consommation; elle est due également à la constance des prix C.I.F. qui n'a laissé de place pour aucune spéculation perturbatrice.

Il est à remarquer que la consommation des engrais potassiques a peu souffert de la crise actuelle; ce fait s'explique aisément, si l'on considère la grande disproportion existant actuellement entre les quantités des principaux éléments fertilisants utilisés au Japon. Si nous choisissons pour base de comparaison la quantité totale d'azote utilisée et que nous lui attribuions un indice égal à 100, nous trouvons pour l'acide phosphorique et la potasse utilisés les valeurs correspondantes suivantes:

(N)	Azote	100
(P)	Ac. Phos.	63
(K)	Potasse	50

Or, si nous comparons ces chiffres—qui représentent, en quelque sorte, la valeur de la "ration alimentaire" moyenne des plantes cultivées au Japon —à ceux qui caractérisent d'autres pays agricoles, nous trouvons pour

	la Hollande	l'Allemagne	la France
N	100	100	100
P_2O_5	120	36	220
K_2O	240	180	130

Nous voyons donc que la consommation des engrais potassiques au Japon n'est encore qu'à son début et doit nécessairement se développer encore considérablement dans un avenir très prochain. La Hollande, universellement connue pour l'intensivité de son agriculture,—et dont le Japon se rapproche en beaucoup de points—nous donne une formule rationnelle qui sera très vraisemblablement celle du Japon dans quelques années.

Cet acheminement vers une "ration alimentaire" plus conforme aux besoins réels des plantes cultivées est mis en évidence d'une façon très nette par la crise économique actuelle; la tableau qui suit nous montre, en effet, une diminution très notable des importations d'engrais azotés (nitrate de soude, sulfate d'ammoniaque, tourteaux) contre une augmentation des importations d'engrais potassiques. Nous noterons, en passant, que la légère diminution subie par le chlorure de potassium provient du fait que, la consommation des engrais potassiques se développant également en Amérique, celle-ci a dû limiter ses exportations de chlorure.

Importations en 1930 (en tonnes)		Augmentations ou diminutions par rapport à 1929
Nitrate de Soude	30.330	– 57.530 tonnes
Sulfate d'Ammoniaque	300.600	– 77.030 "
Poudre d'os	29.970	– 9.074 "
Viande desséchée	25.970	– 9.100 "
Tourteaux divers	70.000	– 67.500 "
Autres engrais	15.000	– 14.000 "
Chlorure de Potassium	23.450	– 3.650 "
Sulfate de Potasse	68.820	† 15.050 "
Phosphates naturels	565.770	† 11.130 "
Tourteaux de soja	919.640	† 94.270 "

L'augmentation inconsidérée de la consommation des engrais azotés et phosphatés, au cours de ces dernières années, est devenue peu à peu en opposition trop flagrante avec la loi physiologique qui régit la nutrition des plantes; à l'instar de toutes les lois naturelles, elle est une des premières à reprendre son cours normal en dépit d'une dépression économique sans précédent dans l'histoire du Japon moderne.

Tokyo, Février 1931.

Edward Turquand Chesley

1894 - 1931

The news of the sudden death of Ed Chesley on Sunday, June 14th, was a distinct shock to many who were looking forward to the Convention at Guelph the next week, where he would have been one of that happy crowd in the scenes he so dearly loved.

Born in Ottawa, his early education was received at the public schools and collegiates of that city. He entered Guelph in 1914 but interrupted his college career to enlist in July, 1915. He served overseas with the Artillery, obtaining his lieutenancy on the field. He returned to graduate with the class of 1922. His natural literary bent led him to work on the "O. A. C. Review", which he edited in his senior year. After graduation he served in editorial capacities on the Toronto "Globe" and the "Ontario Farmer". From 1923 to 1927 he was Assistant Editor, Division of Extension and Publicity, Central Experimental Farm, Ottawa. He also assisted Fred Grindley for a period of several months in editing "Scientific Agriculture". Just previous to his death he had left the Publicity Division of the Massey-Harris Company to enter the Crops Co-operation and Markets Branch of the Ontario Department of Agriculture, where he was engaged in conducting radio and printed publicity.

Ed was a "man's man" and happiest when in the company of his fellow graduates. He took an active part in alumni activities and was a frequent visitor at Guelph. It was noticeable that the touching memorial service in Christ Church Cathedral, Ottawa, was attended largely by O. A. C. men.

The sympathy of the Canadian Society of Technical Agriculturists goes out to the bereaved mother and his sisters and brother.

—C.M.M.

CONCERNING THE C.S.T.A.

Items from the C.S.T.A. Business Session, Guelph Convention, June 26, 1931

W. T. Macoun
President, 1930-31

H. S. Arkell
Vice-President,
1930-31

Georges Bouchard
Vice-President,
1930-31

L. H. Newman
Honorary Secretary
1930-32

Executive in charge of Eleventh Annual Convention

For the benefit of many members who were not able to attend the Guelph Convention we give a summary of the business transacted following the presentation of Committee Reports. Under the system followed by the Directors in handling the business of the Society there is not a great deal of time allowed at each annual convention for the discussion of Committee Reports. It is assumed that the Committees will have canvassed the opinion of the members before bringing in the reports and that there will not be much done in the way of alteration. This was true this year and most of the reports were accepted as read. These reports are printed in full in this issue of *Scientific Agriculture*. The discussion which took place on these reports is given below:

The report of the Progress Committee was carried with some discussion regarding the overlapping of work under the present system of Standing Committees. No definite re-organization was suggested and the matter was left over to the new Executive for consideration.

The report of the Committee on Economics and Marketing was adopted as read.

The report of the Committee on Research was presented by Dr. W. H. Brittain, who asked the meeting to consider the report under the following headings:

1. The retention of the Committee?
2. If retained, how should it be constituted?
3. What definite tasks should the Committee, if reconstituted, undertake?

It was felt that this committee should be retained, but there was considerable difference of opinion as to its exact duties. W. R. Graham suggested

that the membership of the Committee on Research be made up of a representative from each local, thus making the locals actively interested in research. This Research Committee should act as a bureau of information and give out a report of its findings to the different locals. W. A. Weir gave a synopsis of the work of the Toronto local on research, pointing out that this committee was sub-divided into sections made up of men representing the different fields of research, who brought in reports to the local representative of the general Research Committee. Dr. Goulden objected to the suggestion that the committee be made up of a representative from each local, as he felt that this would be unwieldly. Dean E. A. Howes suggested that it was up to each local to get in touch with the Research Committee rather than appoint one individual representative to a central committee. A vote was taken as to whether this committee should be re-elected with the same personnel and under the same constitution as in the past. This question was not settled.

The work of the committee was next considered. Dr. McLoughrey suggested that one of the duties of the committee should be to make a list of the research studies carried on throughout the Dominion with a synopsis of the value of the work and an account of the workers. Dr. L. E. Kirk was of the opinion that the committee itself should know best the most important questions to be dealt with and should act accordingly. Dr. McRostie stated that a list of research projects had been sent in to the committee but this report was ignored and allowed to lie dormant. The general opinion seemed to be that the matter of defining the work and duties of the Committee on Research should be decided by the committee itself. Carried.

Dean Howes opened discussion on the Report on Agricultural Policies. He felt that the work of the Committees on Agricultural Policies and Educational Policies was so closely allied that these committees should be organized into one committee combining the work of both. Very little comment arose regarding this report and no changes or suggestions were considered. Dean Howes moved that this report be adopted, later to be referred back to this committee to decide whether the Committee on Agricultural Policies and the Committee on Educational Policies be amalgamated. Carried.

Dr. L. E. Kirk, representing the Chairman, Dr. L. S. Klinck, gave a very brief outline of the work of the Committee on Educational Policies and also pointed out the fact that the Committees on Educational Policies and Agricultural Policies stood for much the same thing and suggested that these be reorganized into a joint committee. Carried.

The report of the Committee on Publications was presented by Dr. L. E. Kirk, in which he stressed particularly the increase in the cost of cuts and the selection of material used in the magazine. Carried.

W. A. Maw suggested that a definite limit be placed on the cost of cuts in *Scientific Agriculture*, and that any amount above this be borne by the author. The kind of material published in *Scientific Agriculture* was considered briefly and J. B. Harrington suggested that an item be placed in each issue of the magazine, requesting authors to endeavour to condense their material as much as possible and that they use only those cuts which are absolutely necessary. Time did not permit further discussion of this matter.

Standing Committees

Dean Howes was called upon to bring in his report of the Nominations Committee. The names and membership of the Standing Committees were read, as follows:

Committee on Research

W. H. Brittain (Chairman), A. M. Shaw, C. H. Goulden, W. R. Graham, W. Sadler, R. Newton.

Committee on Agricultural Policies

E. A. Howes (Chairman), F. H. Auld, J .B. Fairbairn, H. Barton, E. S. Archibald, G. H. Clark, C. F. Bailey.

Committee on Economics and Marketing

J. F. Booth (Chairman), F. M. Clement, H. S. Fry, J. A. Carroll, J. E. Lattimer, H. C. Bois, H. S. Arkell.

Committee on Educational Policies

L. S. Klinck (Chairman), C. E. Boulden, L. C. Roy, R. S. Duncan, N. C. Mackay, O .S. Aamodt, L. E. Kirk, E. E. Carncross, H. R. Hare, J. A. Clark, A. E. MacLaurin.

Committee on Affiliations

J. M. Swaine (Chairman), J. Coke, F. L. Drayton.

Committee on General Membership

H. G. Crawford (Chairman), A. W. Baker, C. E. Boulden, Leo Brown, G. H. Dickson, W. M. Fleming, F. E. Foulds, J. M. Manson, R. R. McKibbin, P. M. Simmonds, W. W. Thomson, B. F. Tinney, P. H. Vezina, Stanley Wood, A. Godbout.

Employment Bureau Committee

E. S. Archibald, (Chairman), H. G. Crawford, J. F. Booth, A. T. Charron, H. L. Trueman.

Progress Committee

W. V. Longley, (Chairman), J. MacGregor Smith, F. W. Walsh, E. F. Pineau.

Finance Committee

J. B. Harrington (Chairman), L. P. Roy, H. G. Crawford, B. L. Emslie, H. E. Lefèvre, E. K. Hampson, R. D. Colquette, Kenneth King, O. S. Aamodt, E. W. White, S. H. Vigor, E. D. McGreer, J. H. Lavoie, J. B. Fairbairn, E. L. Eaton, E. F. Pineau, B. F. Tinney.

Dean E. A. Howes moved that this report be adopted only under consideration of the following:

(1) That the incoming Executive be asked early to consider the matter of re-organization of the various Standing Committees, with particular reference to:

(a) Amalgamation of the Committee on Educational Policies with the Committee on Agricultural Policies.

(b) The possibility of a Committee on Extension.

(c) That the Committee on Economics and Marketing be superseded by reports from the Economics groups.

(d) That the duties of the General Committee on Membership and the Special Committee on Membership be defined, with a view to the possible elimination of one.

(e) That a definition of the respective fields of the Secretary's report and the report of the Progress Committee be stated.

(2) That the list of members of committees be considered tentative until after the new Executive takes action. Carried.

Resolutions

The report of the Resolutions Committee was read by J. P. Sackville, as follows:

1. RESOLVED that the Canadian Society of Technical Agriculturists express their very special appreciation to the Chairman and members of the Ontario General Convention Committee for the most excellent arrangements of all the details in connection with the carrying through of the 1931 Convention.

2. RESOLVED that the Canadian Society of Technical Agriculturists express their thanks to the Ontario Agricultural College and the Ontario Provincial Department of Agriculture for the hospitality that has been extended at this Convention and particularly for the banquets and entertainments provided.

3. RESOLVED that the hearty thanks of the Canadian Society of Technical Agriculturists be extended to the Dominion Department of Agriculture for its valued co-operation in providing lectures by eminent authorities from Great Britain and the United States at this Convention.

4. RESOLVED that the Canadian Society of Technical Agriculturists in the Eleventh Annual Convention assembled, express their sympathy to the General Secretary, H. L. Trueman, in his unfortunate and regrettable accident and express the hope that he may have a complete and speedy recovery.

5. RESOLVED that the Canadian Society of Technical Agriculturists express their sympathy to Dean H. Barton and regret very much his absence from the Eleventh Annual Convention and express the hope that he may soon regain his usual good health.

6. RESOLVED that the Canadian Society of Technical Agriculturists express appreciation to Mr. J. H. Jackson and all others concerned, for their hospitality in conneciton with the visit to Niagara Falls.

7. RESOLVED that the thanks of the Canadian Society of Technical Agriculturists be tendered to all those institutions and departments giving grants to assist in the publication of *Scientific Agriculture*.

8. RESOLVED that the deep appreciation of all members of the Canadian Society of Technical Agriculturists be conveyed to our special lecturers at the 1931 Convention, viz., Dr. J. B. Orr, Director, Imperial Bureau of Animal Nutrition, Rowett Research Institute, Bucksburn, Aberdeen, Scotland; Dr. O. C. Stine, Bureau of Agricultural Economics, Washington, D.C.; Dr. D. F. Jones, Agricultural Experiment Station, New Haven, Conn.; Dr. Geo. A. Hoffer, Purdue University, Lafayette, Ind.; Dr. H. M. Tory,

President, National Research Council, Ottawa; and Dr. James G. Dickson, Department of Plant Pathology, University of Wisconsin, Madison, Wis., and to the Institutions to which they belong.

9. RESOLVED that the National Research Council of Canada be requested to give consideration to the granting of scholarships to candidates for advanced degrees in the social sciences.

In support of the resolution introduced by the Agricultural Economics Group, Dr. J. F. Booth referred to the fact that so far as could be determined the National Research Council had not to date granted scholarships to candidates for advanced degrees in the social sciences and it was understood that regulations under which such scholarships are granted do not, at the present time, provide for the granting of scholarships to such candidates. He felt that in view of the general interest in economics and other divisions of the social science group, particularly as applied to agriculture, the Society was quite justified in asking the Council to give consideration to this resolution. Furthermore, it was pointed out that when an expression of opinion was obtained from the membership of the Canadian Society of Technical Agriculturists a few years ago as to Group affiliations which they preferred, the Group representing economics received the third largest support, indicating that the interest of the membership in this subject was very keen. He called attention also to the fact that of the twelve hundred members of the C.S.T.A. only a very small number had to date obtained special graduate study in the social sciences and that if we were to keep abreast of the developments in this work every possible means of encouraging graduate study in economics, sociology and allied subjects should be given attention. Considering these several angles he urged the adoption of the resolution by the Society.

J. P. Sackville moved that this report be adopted, provided that the chief of the respective departments represented be thanked for allowing his officer to be present. Carried.

H. S. Arkell
President, 1931-32

G. I. Christie
Vice-President
1931-32

J. A. Godbout
Vice-President
1931-32

H. L. Trueman
General Secretary

Executive in charge of Twelfth Annual Convention, 1932

Convention for 1932

The Directors accepted a very cordial invitation from the Hon. W. C. Buckle, Minister of Agriculture for Saskatchewan, to hold the 1932 Convention in that Province. Dean A. M. Shaw invited the Society to hold the first part of its Convention at the University of Saskatchewan. This invitation was also accepted. It is generally understood that the Canadian Seed Growers' Association and the Canadian Society of Technical Agriculturists will both hold their conventions in this province in connection with the World's Grain Exhibition and Conference to be held at Regina in the latter part of July, 1932. Arrangements as to definite dates were left with the President and General Secretary of the C.S.T.A. conferring with the President and Secretary of the C.S.G.A. and Dr. J. H. Grisdale, Chairman of the Programme Committee for the World's Grain Exhibition and Conference.

New C. S. T. A. Local at Sherbrooke

The Directors accepted the application of a group of thirty men in the Eastern Townships of Quebec to form a separate branch of the C.S.T.A. to be known as the Sherbrooke local. This branch has been organized with the following officers:

Honorary President—J. A. McClary.

Honorary Vice-President—L. C. Roy.

President—Eugène Boivin

1st Vice-President—F. S. Browne.

2nd Vice-President—Henri Lauzière.

Secretary-Treasurer—Stephane Boily.

It is hoped that this Branch will create more interest in the Eastern Townships area than has heretofore existed. Many activities centre round Sherbrooke with its large fair and its district agricultural offices, and it is expected that there will be several opportunities each year for the members to get together. This now gives the Society a total of twenty-one active branches in the Dominion of Canada.

We regret that we are not able to publish a group picture of those attending the Guelph Convention. A very fine photograph was taken but it was too large to reduce to magazine size.

Notes and News

G. B. Rothwell (Toronto '05) has been appointed Dominion Live Stock Commissioner. Since 1911 Mr. Rothwell has been on the staff of the Dominion Department of Agriculture, serving as Assistant Animal Husbandman at the Central Experimental Farm from 1911-1919 and as Dominion Animal Husbandman from 1919-1931. For the past few months Mr. Rothwell has been acting Commissioner and the confirmation of his appointment will be greatly approved by all the live stock men of the Dominion.

C. A. Lamb (British Columbia '21), who has been taking graduate work at Cornell University, Ithaca, N.Y., has been appointed Wheat Breeder at the Ohio Agricultural Experiment Station. His address will be: Department of Agronomy, Ohio Agricultural Experiment Station, Wooster, Ohio.

E. G. Bayfield (Alberta '23) recently received his Ph.D. degree from the Ohio State University, Columbus, Ohio, and has accepted a position of Associate in Agronomy (Cereal Chemist), at the Ohio Agricultural Experiment Station, Wooster, Ohio. Dr. Bayfield occupied the National Milling Company research fellowship for the past two years.

L. M. Ogilvie (Toronto '21), formerly District Representative with the Saskatchewan Department of Agriculture at Cadillac, Sask., is now in the Field Crops Branch, Department of Agriculture, Regina.

Eugêne Boivin (Laval '18), formerly County Agriculturist, Department of Agriculture, Pierreville, P. Q., has changed his address to: Olivier Building, Sherbrooke, P.Q.

S. S. Munro (McGill '30) has been awarded a Research Fellowship in Genetics and is taking post graduate work at the University of Wisconsin, Madison, Wis.

S. T. Hadley (Manitoba '30) has changed his address from Manitoba Agricultural College, Winnipeg, to c/o Ellison Milling and Elevator Company, Lethbridge, Alta.

J. C. Hide (Alberta '30) is now at Argyle, Minn., on soil survey work and will be taking graduate work next winter at the University of Minnesota.

F. G. North (Toronto '23), formerly salesman with the Toronto Tractor & Machinery Company Limited, has been appointed Drainage Engineer for Wm. Hallatt Clay Products, 4 Richards Block, Chatham, Ont.

Hermas Lajoie, (Montreal '31), has changed his address to St. Eustache, County Deux-Montagnes, P.Q.

M. A. Collins (Saskatchewan '28), has received his M.S. degree from the Iowa State College, Ames, Iowa, and has returned to Canada where his address is Crichton, Sask.

C. K. Johns (Alberta '28), has been appointed Fellow in the Department of Agricultural Bacteriology, University of Wisconsin, for the 1931-32 session.

Allen Deacon (Ph. D. Wisconsin '31), a graduate of Macdonald College, has been appointed Dominion Animal Geneticist with headquarters at the Central Experimental Farm, Ottawa.

T. O. Graham (M.S. Minnesota '31), a graduate of the O.A.C., has been appointed Assistant Superintendent at the Dominion Experimental Farm, Morden, Man.

Dr. Kirk Goes to Ottawa

L. E. Kirk (Saskatchewan '16 and Minnesota '27), Professor of Field Husbandry at the University of Saskatchewan since 1922, has been appointed Dominion Agrostologist at the Central Experimental Farm, Ottawa. At the present time it is not known when Dr. Kirk will assume his duties at Ottawa, but probably in the fall. His many friends all over Canada will hasten to congratulate him on this appointment.

General Secretary Improving

The General Secretary, H. L. Trueman, who sustained a fractured spine in a motor accident on the way to the Convention at Guelph is making satisfactory progress. Mr. Trueman spent three weeks in the Ottawa Civic Hospital and was then removed to his home, where it will be necessary for him to remain on his back until the first of October. It is not likely that he will be able to return to the office before December, as the attending physician insists upon six months' care. Mr. Trueman is not suffering and it is expected that he will make a perfect recovery.

New Members

The following applications for regular membership have been received since June 1st, 1931:

Dempsey, W. A. (Toronto, 1930, B.S.A.), Belleville, Ont.

Hide, J. C. (Alberta, 1930, B.Sc.), Argyle, Minn.

Hopper, C. R. (Manitoba, 1930, B.S.A.), Port Arthur, Ont.

McKenzie, D. A. (Toronto, 1908, B.S.A.), Calgary, Alta.

Poulin, L. J. (Laval, 1930, B.Sc.), Plantaganet, Ont.

Smith, W. Hugh (Cambridge, 1927, B.A.), Guelph, Ont.

BOOK REVIEW

The Farm Board by E. A. Stokdyk and Charles H. West. (The Macmillan Co., New York, 1930. pp. 197, price $2.00).

The United States Farm Board, with its policies, its methods, and its $500,000,000, since its inception has undoubtedly been a large factor in the agricultural situation not only in the United States but to some extent in Canada and other countries.

Here is a book, written in non-technical language, which forms a popular description and analysis of the powers of the Board as conferred upon it by the Agricultural Marketing Act of 1929. The authors venture their opinions also as to the ultimate effect of some of the provisions of the Act as carried out by the Board to "control" the surplus in agriculture or to "stabilize" the industry. It will be interesting to re-read this book in a few years, when results of the Board's actions can be more clearly seen. Indeed, it is interesting reading at the moment, when every move by the Farm Board is closely watched and interpreted by the traders, and the economic and human reactions appear.

The authors state that the book was written for the layman and not for the specialist in Agricultural Economics, and it does bring together in very concise form an interesting and readable outline of the whole Farm Board problem. The background leading up to the Board is reviewed; the difficulties and changes in American Agriculture, the McNary-Haugen Bill, the Export Debenture Plan, and other attempts at "Farm Relief" are explained and criticized. The text of the Marketing Act creating the Board is included in the appendix and the authors give an informative analysis of its provisions with regard to loans, stabilization corporations, price insurance, clearing house associations, co-operatives and other features. The concluding chapter is a summary of the authors' opinion as to the possibilities and limitations of the Farm Board.

F.C.H.